HARD RED SPRING WHEAT

QUALITY REPORT

Physical, Chemical, Milling, and Baking Characteristics

1979 CROP

UNITED STATES DEPARTMENT OF AGRICULTURE
SCIENCE AND EDUCATION ADMINISTRATION, AGRICULTURAL RESEARCH
in cooperation with
STATE AGRICULTURAL EXPERIMENT STATIONS

REPORT OF PHYSICAL, CHEMICAL, MILLING, AND BAKING EXPERIMENTS

WITH HARD RED SPRING WHEAT

1979 CROP[1]

by

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1/ This is a progress report of cooperative investigations containing some results that have not been sufficiently confirmed to justify general release; interpretations may be modified with additional experimentation. Confirmed results will be published through established channels. Cooperators submitting samples for analysis have been given analytical data on their samples prior to release of this report. The report is primarily a tool for use of cooperators and their official staffs and to those persons having direct and special interest in the development of agricultural research programs.

This report was compiled by the Science and Education Administration, Agricultural Research, U.S. Department of Agriculture. Special acknowledgment is made to the North Dakota State University for their facilities and services provided in support of these studies. The report is not intended for publication and should not be referred to in literature citations nor quoted in publicity or advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

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Fargo, North Dakota

1979 COOPERATING AGENCIES, STATIONS, AND PERSONNEL

The cooperative agencies and stations conducting the varietal plot and nursery experiments from which the 1979 spring wheat samples were received are listed below:

Idaho Agricultural Experiment Station:

Aberdeen and Bonners Ferry

Minnesota Agricultural Experiment Station:

Crookston, Morris, and St. Paul

Montana Agricultural Experiment Station:

Havre and Sidney

North Dakota Agricultural Experiment Station:

Carrington, Dickinson, Fargo, Langdon, Minot, and Williston

South Dakota Agricultural Experiment Station:

Brookings, Redfield, and Selby

Washington Agricultural Experiment Station:

Pullman

Wisconsin Agricultural Experiment Station:

Madison

Wyoming Agricultural Experiment Station:

Torrington

A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by R. H. Busch, *et al.*, Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1979.

INTRODUCTION

Samples of standard varieties and many of the new strains of hard red spring wheat grown in cooperative experiments in the spring wheat region of the United States[2] have been milled each year by the USDA. The flours were assayed chemically and physically and baked into bread to determine the quality characteristics. The purpose of this report is to make available to the cooperators, quality data on the standard varieties and new strains of hard red spring wheat from the 1979 crop.

The same general format and techniques were used in evaluating the wheat as outlined in quality reports for previous years. The data contained in this report are comparable to data in past reports and, where applicable, average results and also the average results of other crop years are compared. The area averages are tabulated for the uniform regional nursery varieties of Butte, Chris, and Waldron. A three-year average (3-YA) and the averages for the individual three years include all selections grown in the uniform regional nurseries for that year. These results give an overview of individual years and the influence of environment on the crop. The actual crop characteristics may be somewhat different due to differences in varieties, but the change from year to year is applicable.

The evaluation of a sample utilizes three categories: kernel characteristics, milling performance, and baking evaluation. A brief description of the technique is given on pages 10 and 11 of this report. It is possible to quickly deduce the various characteristics of the selection and any outstanding features or deficiencies which are apparent. No specific comments are made regarding the mixogram patterns, since reference mixograms for each of the general types are presented at the end of the report.

The 1979 crop started out in most areas with seeding being delayed from one to four weeks by cool, wet spring weather. For most areas, the growing season was also drier and warmer than normal with rain and humid weather returning in August to slow harvesting; however, favorable conditions returned in September for completion of the harvest. The average extraction was 1.0% lower than the 1978 crops and 0.7% lower than the 3-YA. Wheat mineral content remained the same for the 3-YA. The wheat protein concentration was 0.6% lower than the 1978 average and 0.5% lower than the 3-YA. The physical characteristics of the wheat were similar to the 3-YA.

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[2] Busch, R. H., and Quick, J. S. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1979. SEA/Agricultural Research, U.S. Department of Agriculture and State Agricultural Experiments Stations, St. Paul, MN.

The baking performance of the 1979 crop showed it to be stronger than the 1978 crop. Mixing time was longer and the dough properties were stronger. The absorption was slightly lower than the 3-YA. Flour protein was 0.6% lower than the 3-YA and 0.9% lower than the 1978 crop, but it still produced a loaf volume slightly better than the 3-YA.

Oxidation requirements for the 1979 crop were the same as for the 1978 crop.

SOURCE OF THE 1979 CROP SAMPLES

Tests were performed on 736 samples received from field plot nurseries, uniform regional nurseries, international sawfly yield nurseries, and the international spring wheat yield nursery. These samples originated in eight states: Idaho, Minnesota, Montana, North Dakota, South Dakota, Washington, Wisconsin, and Wyoming. Nineteen stations from these states were represented, namely, Aberdeen, and Bonners Ferry in Idaho; Crookston, Morris, and St. Paul in Minnesota; Havre and Sidney in Montana; Carrington, Dickinson, Fargo, Langdon, Minot, and Williston in North Dakota; Brookings, Redfield and Selby in South Dakota; Pullman in Washington; Madison in Wisconsin; and Torrington in Wyoming.

On page 6 are listed the spring wheats that were included in the 1979 Uniform Regional Nursery trials. The variety or cross, the station that developed the variety, the state selection number, and the C.I. number are given.

Individual wheat samples originating from the three spring wheat areas as outlined in the illustration were blended according to area. The samples were blended in equal portions and milled as area blends.

In Table 4 are given the average data of the Uniform Regional Nursery samples for the previous three crop years and the 1979 area blends and crop year. The data for kernel characteristics are arithmetical averages of the individual samples. However, milling performance, the mixograms and baking data were obtained from the area blends of equal proportions of the individual wheat samples from the 19 stations.

In Table 11 are given the average data for the International Sawfly Yield Nursery samples obtained from the arithmetical averages of the individual samples.
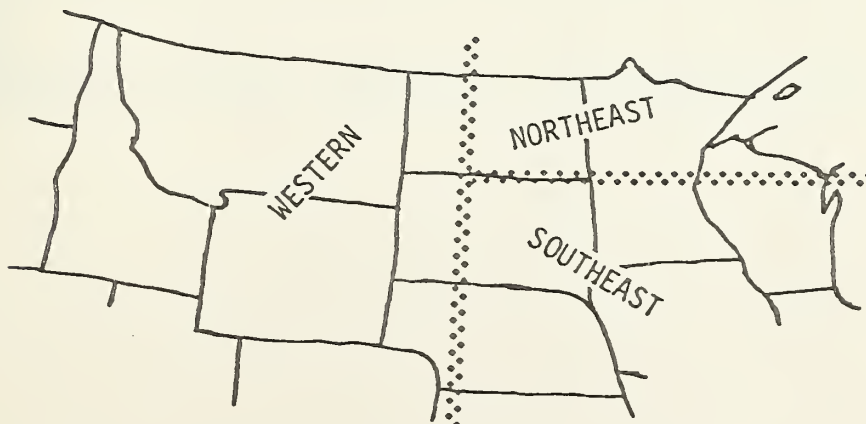
ENTRIES IN THE 1979 UNIFORM REGIONAL HARD RED SPRING WHEAT NURSERY

Entry No.	Cross or Variety	C.I. or Sel. No.	Year Entered	Source
1	Marquis	3651	1929	Canada
2	Chris	13751	1969	USDA-MN
3	Waldron	13958	1964	ND
4	ND507/ND496	ND550	1977	ND
5	Olaf/ND496	ND565	1979	ND
6	Olaf/Butte	ND567	1979	ND
7	Olaf//ND499/ND516	ND569**	1979	ND
8	ND537/ND517-2	ND570	1979	ND
9	Butte/ND527	ND571	1979	ND
10	Olaf/Neepawa	SD2355	1977	SD
11	ND496/Era	SD2356	1979	SD
12	ND476/4/Sheridan/3/Norin 10/ Bev, 14//4* Centana	MT7648**	1979	USDA-MT
13	MT647/MT6868	MT7635**	1979	USDA-MT
14	Era	13986**	1972	USDA-MN
15	WDR*3/Era	MN7324**	1979	USDA-MN
16	Crim/Era*2//Bui-Gallo	MN73168**	1979	USDA-MN
17	Era*2/Chris M	MN7222**	1977	USDA-MN
18	MN67228//WDR*2/Era	MN7336**	1978	USDA-MN
19	Era/FBW406	MN7378**	1978	USDA-MN
20	Np/3/RL4255*4//Mit/CI7090	RL4314	1979	Canada
21	Era (Early)/3/Jt//Cly/ND122	NK75S5511-4**	1979	Northrup King
22	NHS 183-74[1]	HS74183**	1978	North American Pl. Br.
23	NHS 1001-75[1]	HS751001**	1978	North American Pl. Br.
24	K6901532/Era	WA6307**	1979	WA
25	K691495/MN26268	WA6510**	1979	WA
26	K691532/Era	WA6511**	1979	WA
27		WSMP122**	1978	World Seeds, Inc.
28	Butte	17681	1979	ND

** Semidwarf

[1]HS74183 = NHS183-74, HS751001 = NHS1001-75. Both entered in 1978.

METHODS

The terminology and methods used are briefly described below:

Test Weight Per Bushel - The weight per Winchester bushel of cleaned, dry, scoured wheat. To determine the dockage-free test weight on a comparable sample, approximately one pound per bushel should be subtracted from the value given.

1000 Kernel Weight - The 1000 kernel weight was determined by counting the number of kernels in a 10 g sample of cleaned, picked wheat with a Seedburo seed counter[4].

Kernel Size - The percentages of the size of the kernels (large, medium, and small) were determined on a wheat sizer as described by Shuey[5].

The sieves of the sizer were clothed as follows:

                Top Sieve   - Tyler # 7 with 2.92 mm opening
                Middle Sieve   - Tyler # 9 with 2.24 mm opening
                Bottom Sieve   - Tyler #12 with 1.65 mm opening

Potential Yield - The potential yield is not shown on the computer tables, but it can be determined by multiplying the percentages of the overs of each sieve #7, #9, and #12 by the value of 78%, 73%, and 68%, respectively. The accumulation percentage would be the potential yield.

Milling - The samples were cleaned by passing the wheat over an Emerson kicker and dockage tester and through a modified Forster scourer (Model 6). The clean, dry samples were pretempered to 12% moisture for at least 72 hours; then tempered to 16% moisture and allowed to stand overnight prior to milling.

The International Sawfly Nursery, Special Uniform Nursery and the International Spring Wheat Yield Nursery samples were milled on a Brabender Quadrumat Jr. mill. The mill was equipped with a #18 wire on the drum sieve. The throughs of the #18 wire were rebolted on a Strand sifter equipped with a #60 Tyler sieve. The sample was sifted for 1 minute. The throughs of the #60 wire were classified as flour and this was the material tested. The overs of the #18 wire were classified as bran and the throughs of the #18 wire and overs of the #60 Tyler sieve as crude shorts.

4/ Mention of a trademark name or a proprietary product does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture, and does not imply its approval to the exclusion of other products that may also be suitable.

5/ Shuey, William C. A Wheat Sizing Technique for Predicting Flour Milling Yield. Cereal Science Today 5:71-72,75 (1960).

The Uniform Regional Nursery blends and the field plot nursery samples were milled on a Buhler continuous experimental mill. This mill has been slightly modified to give results more comparable to commercial milling. The break scalping sieves were clothed with #54 stainless steel wire, the reduction scalping sieves with #58, #66, and #105 stainless steel wire for the first, second, and third reduction, respectively. All of the flour sieves were clothed with #135 stainless steel wire.

All six flour streams were combined to give the patent flour. The extraction of a good milling wheat using this flow is approximately 68%. This is comparable to a commercial "long patent" extraction flour. At this flour extraction of the wheat, the changes in flour ash are most sensitive to changes in percent extraction.

Protein Content - The protein was calculated by multiplying the factor of 5.7 times the percent nitrogen as determined by the standard Kjeldahl procedure.

Mineral Content or Ash Content - This was determined by measuring the residue of the minerals left after incinerating the sample for approximately 16 hours at 565°C. The results were reported as percentage of the sample that was incinerated.

Mixogram - The mixogram was determined by using 30 g of flour and adding 20 cc of water. The sensitivity spring setting was set at 10. All mixograms were run with constant weight of flour and volume of water. Absorptions reported were adjusted according to the height of the mixogram. The correction factor was determined from a series of flours by varying the amount of absorption.

Mixogram Pattern - The reference mixogram patterns given at the end of the report demonstrate the different types of mixograms that were obtained. A single number is assigned each pattern to characterize and simplify the classification of the curves--the larger number indicating stronger curve characteristics.

Baking Procedure or Formula - The baking formula used was as follows:

100% flour	3% milk D.S.M.
2% salt	3% yeast
5% sugar	2% shortening (Crisco, melted)

The samples were mixed to development in National Manufacturing mixers: the macro mixer for the 25 g samples, and the 100 g special mixer for the 100 g samples. Bromate (7.5 ppm) for oxidation and barley malt flour (0.1%) for enzymatic supplement were added to each sample. All doughs were moulded in a Roll-Er-Up moulder.

Absorption - This was the water, expressed as percent of the flour, required to bring the dough to proper consistency.

Crumb Color - This value was determined by comparing the loaf of the tested sample against a baking standard. This standard was selected as an average for the crop year for the spring wheat area.

Loaf Volume - This was volume of the baked loaf as determined by seed displacement.

All values (protein, ash, and absorption) were reported on a 14% moisture basis.

DISCUSSION

The following discussion presents some of the basic techniques and criteria used in the milling and baking quality evaluation of the samples. There are four major evaluation categories used: kernel characteristics, to characterize the kernel; milling performance, to evaluate the general milling characteristics; mixogram patterns, to classify the flour as to type; and baking evaluation, to rate the flour as to overall baking.

Each evaluation category can be important. A sample could be of a sufficiently poor quality for a given category to eliminate it from possible future testing. However, a sample submitted for the first time and found to be questionable should be tested again to establish if it has a satisfactory or unsatisfactory classification. A sample which is consistently rated as questionable should be discarded.

A computer program for evaluating milling and baking quality was developed from 749 previously evaluated uniform regional nursery samples. The samples represented 5 crop years, 7 states, 21 stations, and 33 series. Chris, Justin, and Selkirk were selected as the standard varieties for each series. The percent deviation of each independent variable varied from the mean of the standard varieties was determined. Limits consistent with previous data obtained on the 749 samples were established for each independent variable. Nebraska regressions were run to establish the regression coefficients of each variable.

Six characteristics (test weight, 1000 kernel weight, percent large kernels, percent small kernels, wheat mineral, and wheat protein) were independent variables used to calculate the dependent variable - Kernel Characteristics. Four characteristics (percent extraction, mineral @65% extraction, milling characteristic, and protein difference between flour and wheat protein) were used to calculate the dependent variable - Milling Performance. Bake absorption, mixing time, dough characteristics, crumb color, crumb grain, and loaf volume were the six independent variables used to determine the dependent variable - Baking Evaluation. These three dependent variables after calculation become independent variables used to calculate the dependent variable - General Evaluation.

The three dependent variables, Kernel Characteristics, Milling Performance, and Baking Evaluation are rated on a scale of 1 to 8, with 1 being Very Satisfactory and 8 being Unsatisfactory. The General Evaluation is rated on a scale of 1 to 4, with 1 being no promise; 2, little promise; 3, some promise; and 4, good promise. If one of the independent variables conver value is 8 (with the exception of crumb color), this automatically will rate the General Evaluation as 1, or no promise. If there are no 8's, the three values are employed in a regression equation to derive the General Evaluation. The weighted value for each of these variables on the General Evaluation is approximately 6% for Kernel

Characteristics, 47% for Milling Performance, and 47% for Baking Evaluation.

To quickly point out problem areas for a selection, two additional columns have been added to the printout. One column is minor deficiencies in which the independent variables converred to a 5 or 6, that is Questionable or Questionable to Unsatisfactory, will appear. The second column is major deficiencies in which the independent variables were converred either to a 7 or 8, that is Unsatisfactory to Questionable and Unsatisfactory. Deficiencies of the various selections may be readily determined by scanning these columns. It is also possible to have one or two independent variables that would appear in the major deficiency column, rating 7. These characteristics should be given serious consideration even though they do not influence the general rating sufficiently to rank the selection as having no promise.

All samples, as in previous years, are compared to a milling and baking standard that represents a blend of the crop year blended to a known quality. However, the samples for the individual stations are evaluated against the average results of the check varieties from the respective stations. The agronomic and climatic conditions of the individual locations can effect the quality of the wheat sample, such that the evaluation at certain locations could have all samples--even the named varieties--classified as Questionable to Unsatisfactory. Therefore, the evaluation ratings of one station are not directly comparable to those of another station. For example, an area may produce low protein wheats which give large and plump kernels, good milling and kernel characteristics, but low protein and unsatisfactory baking properties such as short mixing time, low loaf volume, and weak dough characteristics. The wheat from this area could not be considered as a strong spring wheat and would not maintain the quality expected from the spring wheat producing area. A good variety should have tolerance to a wide range of environmental conditions and the overall picture should be taken into consideration for establishing these varieties.

Kernel Characteristics are important in determining the initial value of the wheat and, if extremely poor, could disqualify a new variety from further consideration. Because of the present grading system, it is desirable to have a good test weight. If a sample has a low 1000 kernel weight and small kernel size distribution, it would be considered a poor sample for milling because of the high ratio of bran to endosperm. Therefore, it is desirable to have plump kernels. Wheat ash is an important factor when comparing a variety against other standard varieties. If a sample consistently has higher wheat mineral content, it increases the probability of having high flour ash. Lower protein than the standard varieties is not desirable because in a low protein crop year the probability of it having such a low protein as to be undesirable is much greater. Therefore, the protein must also be considered as a characteristic when comparing varieties grown in the same locality.

Milling Performance is very important, especially the subcategory of milling characteristics. If low extraction or high flour ash is obtained, these become major factors which are quite unacceptable from a commercial milling standpoint. All flour mineral contents are reported at a constant extraction of 65% so that the figures are directly comparable. As a rule of thumb, one can approximate that each point of ash (0.01%) is equivalent to approximately 2% in extraction.

Milling characteristics are important. A sample which tends to be soft in character requires a different milling technique to be milled properly. On commercial mills flowed for hard vitreous spring wheats, soft milling characteristics cause great difficulty. Therefore, if a sample shows softness in character, it is considered to be unsatisfactory. Likewise, a sample which is extremely hard and vitreous will cause difficulty. Both types of wheat (soft and vitreous) require different roll pressures, clothing, sifter surface, and temper to be milled properly. If these wheats are blended with normal milling wheats, improper results are obtained since these characteristics are not necessarily compatible or additive. Normal to soft score indicates that the sample shows a tendency toward softness of character on the flour mill stocks and extraction. This would indicate that the sample may give some difficulty for certain mill streams, and an adjustment would either have to be made in the milling flow or in tempering procedures to compensate for these differences. The properties of this wheat may or may not be compatible with other wheats with which it may be blended; therefore, it is important to maintain varieties with milling characteristics as uniform as possible.

The amount of protein recovered in the flour for a sample is of importance. The high protein wheats yielding low protein flours are not desirable. Such a wheat would have much of the protein distributed in the outer portion of the kernel which would result in excessive protein in the feed. Therefore, higher wheat protein would be necessary to yield a flour with protein content comparable to that of a wheat that gives good flour protein recovery.

Mixogram Patterns and Farinogram Patterns are important in estimating the strength and mixing tolerance or potential mixing tolerance of a flour. A long, flat curve is more desirable than a short, peaked curve; however, an extremely long curve may be undesirable if the flour would require excessive mixing for proper development. The pattern of the curve is of importance as well as the length, and both must be considered. Abnormal curves, such as sway-back or long initial time to incorporate the water, indicate undesirable characteristics.

Baking Evaluation takes into account the flour absorption, mixing time, dough characteristics, loaf volume, and machinability. A sample which has low absorption would be unsatisfactory compared to other spring wheats with normal absorption. A sample with extremely short mixing time would also be considered undesirable as a good strong spring wheat. When a sample is in the minimal range for these values, it is considered as questionable until further testing demonstrates whether a definite deficiency exists.

Doughs having mellow to weak dough properties show a tendency towards weakness. Also, for mellow to strong, the dough is mellow but has a tendency to be strong, and a strong to mellow dough is just the reverse. Since these characteristics are subjective rather than objective, it is necessary at times to estimate the tendency; therefore, the necessity exists for apparent double grades.

The grain or appearance of the interior of the loaf shows how well the sample stood up during baking and may point out or explain some deficiencies which have been observed during the baking test.

Loaf volume indicates potential strength of the flour in a different manner than mixing time or dough characteristics in that it shows the ability or lack thereof for the dough to expand under pressure and to contain the entrapped gases during this expansion. Weak flours act much like rotten balloons, which burst when blown up and collapse and yield low loaf volume or extremely large volume and large holes in the interior of the loaf. Low protein flours and lifeless (dead) doughs exhibit properties similar to putty and do not expand during fermentation or baking and give low loaf volume. Tough and very bucky doughs are bound too tightly and impede expansion of the gases causing low loaf volume.

General Evaluation rating applies only to the data contained in the year of the report. A new category, the Prospect of a selection, will apply to two or more years of data. The Prospect is given for each selection that has been tested for at least two crop years. This evaluation takes into account the various grading factors and the results of the crop years in an effort to determine if the selection should be considered as a prospective new variety. The main defects and outstanding features are discussed. A selection which is promising should be continued. Those which show some promise with outstanding agronomic characteristics should be seriously considered and looked at in large plots (if it has not been done previously), providing sufficient other information has been obtained. A sample which shows little or no promise should be discontinued.

UNIFORM REGIONAL NURSERY SAMPLES - 1979 CROP

A total of 537 Uniform Regional Nursery samples were received. The samples represented 18 stations from seven states. Wheat blends were made of the samples for this crop year by area. The areas tend to represent movement of the wheat in the market. The individual kernel characteristics were determined on the individual samples to eliminate any possible erroneous results, but the area blends were milled and baked by our macro method. Twenty-eight samples were received from each of the 18 stations. Twenty-three selections were included for quality evaluation in the Uniform Regional Nursery samples. The remainder of the samples were the commercially named varieties of: Butte, Chris, Era, Marquis, and Waldron.

The data for the northeast area blend are given in Table 1. The five stations included in this blend were: Carrington, Fargo, Langdon and Minot, North Dakota; and Crookston, Minnesota.

The data for the southeast area blend are given in Table 2. The six stations included in this blend were: Morris and St. Paul, Minnesota; Brookings, Redfield and Selby, South Dakota; and Madison, Wisconsin.

The data for the western area blend are given in Table 3. The seven stations included in this blend were: Aberdeen and Bonners Ferry, Idaho; Havre and Sidney, Montana; Dickinson and Williston, North Dakota; and Pullman, Washington.

In Table 4 are given the average area results for the combined data of the three check varieties, Butte, Chris, and Waldron samples submitted from the seven states and 18 stations. The results for kernel characteristics and milling performance were obtained by averaging the results from the three tables--1 through 3. Table 5 includes extra samples not received from the other stations. The milling and baking results were obtained from the area blend of the wheats in equal proportions from each of the stations for the respective variety or selection. The regular 100 g straight dough rich formula baking procedure was used in baking. The General Evaluation column includes the general overall performance of the blend of each sample. The General Evaluation given for the sample area blend may not agree with that of the individual wheat samples within the blend, since averages do not express the range, and poor characteristics may be masked. In an endeavor to clarify this problem, the average general evaluation, the number of total deficiencies, and the number of major deficiencies are shown in parenthesis after each variety or selection--(Average General Evaluation - #Total Deficiencies/#Major Deficiencies).

For simplicity and brevity of the report, as in previous reports, each variety will be discussed from the general viewpoint rather than the individual areas. General Evaluation summarizes the results from the individual areas for one crop year. The evaluation is more meaningful for the overall performance of a variety or selection when at least two or more crop years are included. Data discussed under the category, The Prospect, includes two or more years.

Also given in Table 4 are comparisons of the previous three crop years which include all selections grown in the uniform regional nursery for that year, as well as the 3-YA. In general, the 1979 crop had slightly poorer kernel characteristics (test weight, 1000 kernel weight and wheat protein) than the 3-YA. Milling was down slightly from the 3-YA. The absorption was slightly lower and mixing time was one-half minute longer than the 3-YA. Dough characteristics were slightly stronger and the crumb color, crumb grain and loaf volume were slightly better than the 3-YA.

A comparison of the 1979 and 1978 crop results showed the 1979 crop to be slightly poorer. In general, the kernel characteristics (1000 kernel weight and wheat protein) were lower. Milling was down 1.0%; however, it had .01 percentage point less flour mineral content than the 1978 crop. The 1979 baking absorption was 0.4% more than in 1978 with three-fourths minute longer mixing time, and also a stronger dough. Crumb color, crumb grain and loaf volume were also slightly better.

Average results of the varieties Butte, Chris, and Waldron for each of the individual areas were used as standards for the other selections from that area; therefore, a variety or selection may be rated satisfactory in two different areas, but comparison of the data may show much poorer results for one area due to adverse environmental conditions. Thus, the sample with poor results could be rated as having unsatisfactory quality when compared to the overall spring wheat area, even though it may be rated as showing good promise for one area.

By using a new format and employment of the computer, all named varieties receive a general evaluation. Only those varieties in the "Good Promise" category could be consistently considered as acceptable to the trade both in the domestic as well as foreign markets. However, in order to be brief, the varieties may be broadly classified as follows:

> Butte   (3.6 - 4/2) - Good Promise
>
> Chris   (3.9 - 21/0) - Good Promise
>
> Era   (1.6 - 50/25) - Little Promise
>
> Marquis (2.4 - 40/9) - Little Promise
>
> Waldron (3.7 - 11/1) - Good Promise

MN 7222 (2.0 - 20/12)

Kernel Characteristics - Questionable to Unsatisfactory. Low protein content.

Milling Performance - Very Satisfactory.

Baking Evaluation - Unsatisfactory. Low absorption.

MN 7222 (Cont'd)

General Evaluation - Based on this year's crop results, this selection would show little promise as a new variety due to low protein content and baking absorption.

The Prospect - Based on three crop years, this selection would show little promise as a new variety because of low protein and low baking absorption.

MN 7324

Kernel Characteristics - Questionable. Low protein content.

Milling Performance - Questionable to Satisfactory. Tendency toward high flour mineral content at 65% extraction.

Baking Evaluation - Satisfactory to Questionable. Tendency to low absorption.

General Evaluation - Based on this year's crop results, this selection would show some promise although it does have a tendency for minimum protein and bake absorption.

MN 7336 (1.5 - 20/9)

Kernel Characteristics - Questionable to Satisfactory. Low protein content.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory to Questionable. Weak dough.

General Evaluation - Based on this year's crop results, this selection shows little promise because of low protein and weak dough handling characteristics.

The Prospect - Based on two crop years, this selection would show little promise as a new variety due to low protein and weak dough handling characteristics.

MN 7378 (1.5 - 15/10)

Kernel Characteristics - Unsatisfactory to Questionable. Low protein content.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory. Low absorption.

General Evaluation - Based on this year's crop results, this selection shows no promise because of low protein and bake absorption.

MN 7378 (Cont'd)

The Prospect - Based on two crop years, this selection shows little promise as a new variety due to low protein and bake absorption.

MN 73168

Kernel Characteristics - Unsatisfactory to Questionable. Low protein content.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65% extraction.

Baking Evaluation - Questionable. Tendency toward low bake absorption.

General Evaluation - This selection, based on this year's crop, shows little promise due to low protein and bake absorption.

MT 7635

Kernel Characteristics - Questionable. Tendency toward low test weight, small kernel size and high wheat mineral content.

Milling Performance - Unsatisfactory. High mineral content at 65% extraction and a tendency toward low flour extraction.

Baking Evaluation - Questionable to Unsatisfactory. Tendency for low bake absorption.

General Evaluation - Based on this year's crop results, this selection shows no promise due to high mineral content at 65% flour extraction and low bake absorption.

MT 7648

Kernel Characteristics - Questionable. Low percentage of large kernels.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65% extraction.

Baking Evaluation - Unsatisfactory. Low bake absorption, long mix time, and erratic dough handling characteristics.

General Evaluation - Based on this year's crop results, this selection shows no promise as a new variety because of low bake absorption, long mix time, and poor kernel characteristics.

ND 550 (3.6 - 4/0)

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory to Questionable. Some tendency to high mineral content at 65% extraction.

Baking Evaluation - Satisfactory to Questionable. Tendency toward erratic dough characteristics.

General Evaluation - This selection shows good promise, based on this year's crop results.

The Prospect - Based on three crop years, this selection would show good promise as a new variety.

ND 565

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Satisfactory to Questionable. Tendency toward weak dough and low loaf volume.

General Evaluation - This selection shows good promise, based on this year's crop results.

ND 567

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Satisfactory to Questionable. Tendency toward a strong dough.

General Evaluation - Based on this year's crop results, this selection would show good promise as a new variety.

ND 569

Kernel Characteristics - Satisfactory to Questionable. Tendency toward low protein.

Milling Performance - Satisfactory.

Baking Evaluation - Satisfactory to Questionable. Tendency toward minimum bake absorption.

General Evaluation - Based on this year's crop results, this selection would show good promise as a new variety.

ND 570

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Satisfactory to Questionable. Somewhat erratic results.

General Evaluation - This selection would show good promise as a new variety based on this year's results.

ND 571

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Satisfactory to Questionable. Somewhat erratic results.

General Evaluation - Based on this year's results, this selection would show good promise.

NHS 183-74 (2.2 - 21/7)

Kernel Characteristics - Unsatisfactory to Questionable. Low protein content, small percentage of large kernels, and a tendency toward low test weight.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable to Unsatisfactory. Low bake absorption.

General Evaluation - Based on this year's crop results, this selection would show little promise due to low protein content and bake absorption.

The Prospect - Based on two crop year's results, this selection shows little promise because of low protein content, a tendency toward low bake absorption and percentage of large kernels.

NHS 1001-75 (2.0 - 23/7)

Kernel Characteristics - Questionable to Unsatisfactory. Low protein content and tendency toward small percentage of large kernels.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65% extraction.

Baking Evaluation - Unsatisfactory to Questionable. Low bake absorption.

NHS 1001-75 (Cont'd)

General Evaluation - Based on this year's crop results, this selection shows little promise due to low protein content and bake absorption.

The Prospect - Based on the results for two crop years, this selection would show little promise as a new variety due to low protein content, bake absorption and a tendency toward erratic kernel characteristics.

NK 75S5511-4

Kernel Characteristics - Questionable to Unsatisfactory. Low protein content.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65% extraction.

Baking Evaluation - Questionable to Satisfactory. Tendency toward low bake absorption.

General Evaluation - This selection shows little promise as a new variety due to low protein content and bake absorption.

RL 4314

Kernel Characteristics - Satisfactory to Questionable. Tendency toward low 1000 kernel weight and percentage of large kernels.

Milling Performance - Satisfactory to Questionable. Minimal percent extraction.

Baking Evaluation - Questionable to Unsatisfactory. Low bake absorption.

General Evaluation - Based on this year's crop results, this selection would show little promise as a new variety due to low bake absorption.

SD 2355 (2.7 - 15/3)

Kernel Characteristics - Satisfactory to Questionable. Tendency toward low protein content.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable to Unsatisfactory. Tendency toward a weak dough.

General Evaluation - Based on this year's crop results, this selection shows little promise due to its tendency toward a weak dough.

The Prospect - Based on the results for three crop years, this selection would show some promise as a new variety although it does have a tendency for a weak dough and minimum protein.

SD 2356

Kernel Characteristics - Questionable to Satisfactory. Tendency toward low protein content.

Milling Performance - Satisfactory to Questionable. Tendency for high mineral content at 65% extraction.

Baking Evaluation - Questionable to Unsatisfactory. Weak dough.

General Evaluation - Based on this year's crop results, this selection shows little promise due to weak dough characteristics and tendency to low protein content.

WA 6307

Kernel Characteristics - Unsatisfactory. Small percentage of large kernels, low protein content, and tendency for large percentage of small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Unsatisfactory to Questionable. Low bake absorption and a tendency toward a weak dough and low loaf volume.

General Evaluation - Based on this year's crop results, this selection shows little promise as a new variety due to low protein content, small percentage of large kernels, low bake absorption and weak dough.

WA 6510

Kernel Characteristics - Unsatisfactory to Questionable. Low protein content, and tendency to low percentage of large kernels.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65% extraction.

Baking Evaluation - Unsatisfactory. Low bake absorption and weak dough, Tendency toward low loaf volume.

General Evaluation - Based on this year's crop results, this selection would show no promise as a new variety due to low protein content, bake absorption, and weak dough.

WA 6511

Kernel Characteristics - Unsatisfactory to Questionable. Low protein content and tendency toward low test weight and percentage of large kernels.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65% extraction.

Baking Evaluation - Questionable. Minimum bake absorption.

General Evaluation - This selection would show <u>little promise</u> as a new variety based on this year's crop results due to low protein content and tendency for low bake absorption.

<u>WSMP 122</u> (1.0 - 29/14)

Kernel Characteristics - Unsatisfactory to Questionable. Low protein content and tendency toward low percentage of large kernels.

Milling Performance - Questionable to Unsatisfactory. High mineral content at 65% flour extraction.

Baking Evaluation - Unsatisfactory to Questionable. Weak dough and tendency toward minimum bake absorption.

General Evaluation - Based on this year's crop results, this selection would show <u>no promise</u> due to low protein content, high mineral content at 65% extraction and a tendency toward a weak dough.

The Prospect - Based on two crop years, this selection would show <u>no promise</u> as a new variety due to low protein content, weak dough and a tendency to high mineral content at 65% flour extraction.

<u>SPECIAL SAMPLES INCLUDED WITH THE</u>
<u>1979 UNIFORM REGIONAL HARD RED SPRING</u>
<u>WHEAT NURSERY</u>

These samples were milled on the Brabender Quadrumat Jr. mill and a 25 gram flour sample was baked. For the samples from Williston, North Dakota, Pullman, Washington, Aberdeen and Bonners Ferry, Idaho, the 1979 milling and baking standard was used as the standard. Torrington, Wyoming, had 24 samples and was not included in the Uniform Regional Blends. Butte, Chris and Waldron were the standards.

These samples will not be discussed in detail. The results and general evaluation for each station are given in Table 5.

FIELD PLOT NURSERY SAMPLES - 1979 CROP

Forty-five samples were received from two states and two stations. The data for the individual samples are given in Tables 6 and 7.

NORTH DAKOTA SAMPLES

Thirty-five samples were received from the Williston station. Twenty of the samples were named varieties which have been released. The data are given in Table 6. Butte, Olaf and Waldron were used as standards. Samples were sent from Dickinson but were not received in our laboratory.

WISCONSIN SAMPLES

Ten samples were received from the Madison station. Nine of the samples were named varieties which have been released. Butte and Olaf were used as the standards. Data for these samples are given in Table 7.

INTERNATIONAL SAWFLY NURSERY SAMPLES - 1979 CROP

Eighty samples were received from two stations in Montana and three stations in North Dakota. Sixteen samples were received from each of the stations: Havre and Sidney, Montana; and Fargo, Minot, and Williston, North Dakota. Six of these samples were the named varieties: Chris, Fortuna, Len, Thatcher, Tioga, and Waldron. Ten of the samples were the selections: MT 766, MT 783, MT 7620, MT 7732, MT 7810, SU 7 's'-3, SU 28 's'-1, SU 56, SU 57, and 7748-2768. The Sidney, Montana, station did not include the selection 7748-2768 but had seven named varieties with Chinook being included. Data for these samples from the individual stations are given in Tables 8 through 10. In Table 11 are the averages for these data. Again, averages and blends may not reflect the range of response of a selection or variety to environmental conditions; therefore, averages of the general evaluation, number of total deficiencies, and the number of major deficiences are given as they were for the Uniform Regional Nursery series. The varieties Fortuna, Thatcher, and Tioga from each station were used as the standards.

Chris   (3.2 - 32/9) - Some Promise

Fortuna   (3.8 - 7/0) - Good Promise

Len   (2.1 - 41/10) - Little Promise

Thatcher   (2.0 - 50/18) - Little Promise

Tioga   (3.9 - 3/0) - Good Promise

Waldron   (3.4 - 19/0) - Some Promise

MT 766   (2.4 - 30/8)

Kernel Characteristics - Questionable. Low percentage of large kernels. Tendency toward low kernel weight and test weight.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable to Satisfactory. Long mix time and tendency toward low bake absorption.

General Evaluation - This selection based on this year's crop results would show little promise due to low percentage of large kernels and long mix time.

The Prospect - Based on two crop years' results, this selection would show little promise as a new variety due to poor kernel characteristics and a tendency toward long mixing time.

MT 783

Kernel Characteristics - Questionable to Satisfactory. Low percentage of large kernels and tendency toward low kernel weight.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65 percent flour extraction.

Baking Evaluation - Questionable to Satisfactory. Long mix time.

General Evaluation - Based on this year's crop results, this selection would show some promise as a new variety. However, its kernel characteristics are questionable and the mixing time has a tendency to be long.

MT 7620

Kernel Characteristics - Unsatisfactory. Low test weight, 1000 kernel weight, percentage of large kernels, and large percentage of small kernels.

Milling Performance - Questionable to Satisfactory. Low flour extraction.

Baking Evaluation - Questionable to Satisfactory. Long mix time and crumb grain down.

General Evaluation - This selection would show no promise as a new variety based on this year's crop results.

MT 7732

Kernel Characteristics - Satisfactory to Questionable. Tendency toward low test weight and percentage of large kernels. Also high wheat mineral content.

Milling Performance - Questionable. Tendency toward low flour extraction and high mineral content at 65 percent flour extraction.

Baking Evaluation - Questionable. Long mix time and crumb grain down.

General Evaluation - Based on this year's crop results, this selection would show little promise as a new variety due to low percent of large kernels, flour extraction, and long mix time.

MT 7810

Kernel Characteristics - Unsatisfactory. Low 1000 kernel weight, percentage of large kernels, and tendency toward low test weight and high wheat mineral content.

Milling Performance - Questionable to Satisfactory. Tendency toward high mineral content at 65 percent flour extraction.

Baking Evaluation - Unsatisfactory to Questionable. Extremely long mix time.

General Evaluation - This selection would show no promise as a new variety based on this year's crop results.

SU 7 's'-3

Kernel Characteristics - Questionable to Satisfactory. Tendency toward low 1000 kernel weight and percentage of large kernels.

Milling Performance. - Satisfactory.

Baking Evaluation - Questionable to Unsatisfactory. Low bake absorption and loaf volume.

General Evaluation - Based on this year's crop results this selection would show little promise due to low bake absorption and poor kernel characteristics.

SU 28 's'-1 (3.5 - 20/0)

Kernel Characteristics - Satisfactory to Questionable. Tendency toward low 1000 kernel weight and percentage of large kernels.

Milling Performance - Very Satisfactory.

Baking Evaluation - Satisfactory to Questionable. Tendency toward a weak dough and crumb grain is down.

General Evaluation - This selection based on this year's crop results would show some promise as a new variety but the results are somewhat erratic.

The Prospect - This selection based on three crop years' results would show good promise, however the 1979 crop results were somewhat erratic.

SU 56 (2.9 - 43/9)

Kernel Characteristics - Questionable to Satisfactory. Low kernel weight, percentage of large kernels, and a tendency toward high wheat mineral content and percentage of small kernels.

Milling Performance - Satisfactory to Questionable. Tendency toward high mineral content at 65 percent flour extraction.

Baking Evaluation - Satisfactory to Questionable. Somewhat erratic results.

General Evaluation - This selection would show some promise based on this year's crop results.

The Prospect - Based on three years' crop results this selection would show some promise as a new variety, but it did have somewhat erratic results.

SU 57 (2.9 - 33/6)

Kernel Characteristics - Satisfactory to Questionable. Tendency toward low 1000 kernel weight and percentage of large kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable to Satisfactory. Tendency toward low loaf volume, crumb grain score and long mix time.

General Evaluation - Based on this year's crop results this selection would show some promise as a new variety.

The Prospect - Based on three years' crop results this selection would show some promise as a new variety, however the results are somewhat erratic.

7748-2768 (1.9 - 58/19)

Kernel Characteristics - Questionable. Low percentage of large kernels and 1000 kernel weight.

Milling Performance - Satisfactory.

Baking Evaluation - Questionable. Tendency toward low bake absorption and loaf volume, also weak dough and low crumb grain score.

General Evaluation - This selection would show some promise as a new variety based on this year's crop results.

The Prospect - Based on three years' crop results this selection would show little promise as a new variety due to small kernel size and poor baking evaluation.

INTERNATIONAL NURSERY - 1979 CROP

Forty-four samples were received from St. Paul, Minnesota. Only kernel characteristics, milling performance, mixograph absorption and mixograph pattern were requested for quality data.

These samples will not be discussed in detail. The data are presented in Table 11.

TABLE 1
QUALITY DATA FROM UNIFORM NURSERY SAMPLES   1979 CROP

VARIETY OR SEL. NO.	T.W. #/BU. 1/	1000 KWT. 2/	KERNEL SIZE LG	MED	SM	WHT. MIN. 2/	WHT. PRO. 2/	KERN. CHAR. 3/	FLR. EXT. %	MIN.@ 65%FX. 2/	FLR. PRO. %	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/	MIX. PAT. 5/	BAKE ABS. 2/	MIX. TIME MIN.	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC.	BAKE EVAL. 3/	GEN. EVAL. 3/	MINOR DEFICIENCY	MAJOR DEFICIENCY
NORTHEASTERN REGIONAL BLENDS																									
BUTTE	60.8	32.8	42	57	1	1.62	14.1	2	70.7	0.36	12.9	1	2	65.7	5	65.7	3.50	3	100.7	88.09	905	2	4	KW SM	
CHRIS	60.5	29.3	30	66	3	1.70	14.9	3	70.1	0.38	11.5	1	2	65.0	4	65.2	3.50	3	101.8	89.99	900	8	4	KW SM	M65 8A
ERA	59.1	29.2	30	66	4	1.69	13.3	6	71.4	0.44	11.9	4	8	61.9	5	62.3	4.25	3	101.0	87.99	925	8	1	SM WP	
MARQUIS	59.1	13.1	40	57	3	1.73	13.8	8	69.0	0.42	13.2	1	5	64.2	5	64.0	3.25	3	102.8	87.99	945	2	1	SM	KW M65
WALDRON	58.4	34.0	55	44	1	1.73	14.8	2	65.8	0.41	13.8	1	3	64.7	5	65.0	3.75	3	101.0	88.99	900	2	4	M65	
MN 7222	58.7	29.9	34	63	3	1.65	13.0	7	71.8	0.39	12.0	1	2	61.9	6	62.3	4.75	3	102.0	89.10	915	8	1	SM	WP 8A
MN 7324	59.1	36.7	30	68	2	1.56	13.1	5	69.1	0.39	12.2	1	2	64.2	4	64.1	3.75	3	100.7	90.99	905	2	4	WP	8A
MN 7336	58.0	34.0	52	45	2	1.64	13.1	6	71.6	0.39	12.0	1	2	64.7	7	65.1	2.50	3	100.0	87.07	945	8	4	SM	WP OO
MN 7378	59.0	35.2	45	49	3	1.63	12.8	8	71.5	0.38	11.8	1	2	61.3	3	61.8	5.25	3	103.8	89.99	915	8	1		WP 8A
MN 73168	58.9	35.4	51	47	2	1.63	12.8	8	71.6	0.40	12.0	1	3	64.2	6	64.7	5.00	3	102.0	88.09	925	4	1	M65 OO	WP
MT 7635	57.8	29.6	26	70	4	1.84	13.9	6	67.9	0.45	13.0	1	8	63.2	5	63.7	4.00	3	100.0	87.99	925	4	1	TW KW	M65
MT 7648	59.3	25.6	22	74	4	1.78	14.0	5	69.4	0.41	13.7	1	2	61.3	8	61.8	7.50	4	103.00	88.99	930	4	1	KW LG	8A NT
ND 550	60.5	33.4	45	53	2	1.72	14.3	2	65.3	0.37	13.1	1	2	65.3	6	66.8	4.50	3	100.0	89.70	865	5	3	OO	SM M65
ND 567	61.3	36.1	58	41	1	1.69	14.9	2	65.6	0.38	13.7	1	2	66.3	7	66.7	5.00	3	103.9	86.07	920	2	4	OO	
ND 569	58.5	37.3	60	38	2	1.70	14.1	3	70.5	0.36	12.8	1	2	66.2	6	66.5	4.25	3	101.0	86.09	955	2	4		WP 8A
ND 570	55.7	33.1	47	51	2	1.70	14.7	2	71.2	0.35	13.9	1	4	66.3	6	66.3	4.50	3	103.9	88.99	895	5	4	SM	
ND 571	59.6	33.9	67	30	3	1.65	12.4	2	69.8	0.38	13.3	1	2	62.5	6	62.6	4.50	3	100.7	88.10	970	7	3		
NHS 183-74	59.5	25.6	27	70	3	1.66	12.7	8	69.8	0.36	11.7	1	3	66.5	5	62.9	4.50	2	100.7	88.07	970	8	1	SM	WP 8A
NHS 1001-75									71.8	0.40				61.3	5	61.6	3.75	4	101.0	85.70	930	8	4	KW	
NK 755511-4	60.4	34.8	37	60	3	1.73	12.7	8	72.1	0.39	11.8	1	2	62.5	5	62.9	4.50	2	102.0	88.09	935	5	1	SM	WP 8A
RL 4114	60.8	34.1	50	46	2	1.70	15.5	3	70.4	0.38	13.4	1	3	65.0	3	65.0	3.50	4	100.00	86.99	900	8	1	OC	8A
SD 2355	59.8	37.2	38	60	2	1.66	13.7	4	70.6	0.37	12.3	1	2	65.0	3	65.0	2.50	1	100.00	88.99	935	8	1		OO
SD 2356	60.9	35.4	45	52	3	1.62	13.7	4	71.0	0.37	12.1	1	2	61.6	9	61.6	2.25	6	101.0	87.01	890	8	1	WP TW	OC
WA 6307	57.8	30.9	22	72	6	1.61	12.2	8	70.3	0.40	11.5	1	3	61.6	4	61.5	3.50	6	101.0	87.09	875	4	1	LG M65	SM WP 8A OO
WA 6510	58.4	32.1	34	63	4	1.63	12.2	8	71.6	0.40	11.2	1	3	63.2	6	63.6	4.75	6	104.5	85.09	870	8	1	SM TW	WP OC
WA 6511	57.5	32.6	27	65	4	1.63	12.6	8	70.1	0.39	11.7	1	4	64.2	5	64.5	4.00	4	101.02	89.99	940	4	1	TW LG	WP OC
WSMP 122	58.3	31.3	28	67	5	1.59	12.6	8	65.2	0.41	11.6	1	3	65.3	4	65.3	3.00	5	101.0	85.99	910	8	1	LG SM	WP OC

1/ CLEAN DRY - SUBTRACT 1 LB./BU. FOR OCCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE, 5 = QUESTIONABLE-SATISFACTORY, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = SOFT, 5 = GRITTY, 6 = VERY SOFT.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN. (1 = VERY WEAK ---- 11 = VERY STRONG)
6/ 1 = BUCKY, 2 = VERY ELASTIC, 3 = ELASTIC, 4 = ELASTIC-PLIABLE, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK, 20 = SLIGHTLY DEAD, 30 = DEAD.
7/ XXX.00 = BRIGHT WHITE, XXX.2 = WHITE, XXX.3 = GRAY, XXX.5 = CREAMY, XXX.1 = VERY GRAY.
8/ XXX.00 = SOGGY, XXX.01 = THICK WALL, XXX.MESH, XXX.03 = CLOSE, XXX.05 = OPEN, XXX.06 = OPEN-SLIGHTLY IRREGULAR, XXX.07 = IRREGULAR-OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = SLIGHTLY OPEN-IRREGULAR.
   XXX.50 = SLIGHTLY IRREGULAR-OPEN, XXX.70 = SLIGHTLY OPEN, XXX.90 = OPEN, XXX.99 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

TABLE 2　　1979 CROP

QUALITY DATA FROM UNIFORM NURSERY SAMPLES

VARIETY OR SEL. NO.	T.W. /BU 1/	1000 KWT G. 2/	KERNEL SIZE LG %	KERNEL SIZE MED %	KERNEL SIZE SM %	WHT. MIN. 2/	WHT. PRO. 2/	KERN. CHAR. 3/	FLR. EXT. 65EX %	FLR. MIN. 65EX 2/	FLR. PRO. 2/	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/	MIX. PAT. 5/	BAKE ABS. 2/	MIX. TIME MIN. 6/	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC.	BAKE EVAL. 3/	GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY
SOUTHEASTERN REGIONAL BLENDS																									
BUTTE	61.8	32.1	41	56	3	1.76	13.2	2	70.5	0.36	12.2	1	2	63.5	4	63.4	3.25	3	102.0	87.09	875	2	4	LG	
CHRIS	60.3	29.1	45	52	3	1.72	13.1	2	65.8	0.80	11.4	1	2	63.7	5	64.6	3.75	3	101.0	87.07	960	2	4		WP 84
ERA	60.3	29.8	27	69	4	1.80	12.3	6	65.7	0.41	11.5	1	3	61.6	5	61.6	4.75	3	101.0	87.09	895	5	4	SW	
MARQUIS	58.3	29.8	28	67	5	1.80	12.7	6	69.6	0.43	12.0	1	4	61.6	6	62.5	4.25	4	102.0	85.99	920	6	2	TW SW WP M65 84	
WALDRON	58.8	31.8	43	55	2	1.86	13.8	3	65.6	0.43	12.9	1	4	62.8	4	63.0	3.75	2	102.0	85.07	920	2	3	M65	
MN 7222	59.6	29.7	35	64	1	1.72	12.5	5	70.7	0.40	11.6	1	2	60.0	5	60.2	5.50	3	101.8	86.99	905	8	1	WP	84
MN 7324	59.5	34.3	45	52	3	1.68	12.6	5	67.5	0.42	11.5	1	3	62.5	4	62.7	3.50	4	101.5	85.99	920	4	2	WP M65 QC	84 QC
MN 7336	58.8	34.8	43	54	3	1.73	12.4	5	71.4	0.42	11.0	1	2	61.0	2	61.4	2.25	1	100.0	91.99	900	8	2	WP M65	WP 84
MN 7378	60.5	33.6	41	56	3	1.74	11.6	6	69.6	0.38	11.0	1	2	57.2	7	57.4	5.00	3	102.0	85.99	900	5	1		84
MN 73168	60.5	33.0	44	52	4	1.77	12.5	5	65.2	0.41	11.5	1	2	61.3	5	61.5	4.50	3	101.0	85.99	905	5	2	WP	84
MT 7635	58.7	29.1	21	73	6	1.90	13.0	5	67.6	0.45	12.3	1	3	61.0	8	61.2	4.50	3	101.0	88.09	935	8	1	TW LG SW	M65 84
MT 7648	60.2	29.4	19	77	4	1.83	12.8	5	69.0	0.40	12.0	1	4	59.7	6	60.1	7.25	3	102.0	86.99	895	8	3	LG WP	8A MT QC
NO 550	61.3	32.5	38	59	3	1.78	13.6	5	65.0	0.42	12.5	1	2	64.2	7	64.5	5.00	3	101.0	88.07	910	2	3	M65	
NO 565	61.1	32.8	38	60	2	1.76	13.4	3	65.1	0.39	11.8	1	2	63.6	5	64.0	4.00	3	101.5	88.07	870	2	4		
NO 567	62.4	36.1	47	52	1	1.77	14.1	2	69.2	0.37	13.0	1	2	66.3	7	66.7	5.25	2	104.9	87.07	955	2	4		
NO 569	59.5	36.1	59	40	1	1.82	12.1	3	70.2	0.37	12.1	1	2	62.8	6	63.1	4.25	3	102.0	84.05	945	2	4		
NO 570	60.8	33.3	47	52	1	1.81	13.9	2	70.6	0.38	13.0	1	1	65.3	5	65.6	4.00	3	104.9	87.05	960	2	4		
NO 571	60.8	34.8	52	46	2	1.78	13.4	2	74.0	0.35	12.5	1	2	65.3	7	66.0	5.00	3	105.5	88.05	1010	2	4		
NHS 183-74	58.6	31.0	18	78	4	1.76	13.4	6	71.0	0.35	11.4	1	2	61.0	4	61.3	4.25	3	102.5	86.05	900	8	4	TW LG WP	WP 8A
NHS 1001-75	60.3	30.4	29	67	4	1.72	12.2	6	71.1	0.39	11.2	1	2	61.0	4	61.3	4.25	3	101.8	89.59	945	5	3		8A
NK 75S5511-4	60.4	33.3	31	65	4	1.82	12.7	5	71.2	0.40	11.8	1	2	63.5	6	64.0	4.00	3	101.0	88.09	895	2	4	WP	
RL 4314	59.1	28.9	30	66	2	1.80	13.5	3	70.1	0.40	12.9	1	2	63.2	4	63.5	3.50	4	100.7	88.09	920	2	4		
SD 2355	50.7	30.6	26	70	0	1.68	12.8	6	69.4	0.39	11.3	1	2	64.2	5	62.7	2.75	3	101.0	85.59	905	8	4	TW WP	QC WP 8A
SD 2356	61.1	35.0	54	44	5	1.68	12.8	4	69.4	0.39	11.3	1	2	64.4	3	64.4	4.75	3	101.0	85.59	905	6	4	WP SW	QC WP 8A
BA 6307	59.0	29.8	12	83	4	1.73	12.0	7	70.5	0.38	11.1	1	2	61.3	5	61.6	4.00	6	102.0	85.09	885	5	3	SW	LG WP 8A
W4 6510	58.3	28.9	18	78	4	1.78	12.0	7	65.7	0.41	11.2	1	3	61.3	6	61.6	5.00	3	101.7	88.09	865	8	1	TW LG 84	WP 84
W4 6511	58.4	28.4	24	72	4	1.73	12.1	7	65.3	0.44	11.0	1	5	61.6	4	62.4	3.00	4	101.0	88.09	930	4	3	TW LG 84	WP 84
WSMP 122	59.0	30.5																		82.09	900		1	LG QC	WP M65

1/ CLEAN DRY — SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = NORMAL, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE, 5 = QUESTIONABLE, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = SOFT, 5 = 50FT, 6 = VERY 50FT.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN. (1 = VERY WEAK — 11 = VERY STRONG)
6/ 1 = BUCKY, 2 = VERY ELASTIC, 3 = ELASTIC, 4 = ELASTIC-PLIABLE, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK, 20 = SLIGHTLY QE4O, 30 = QE4O.
7/ XXX.00 = BRIGHT WHITE, XXX.01 = WHITE, XXX.7 = SLIGHTLY CREAM, XXX.05 = CREAM, XXX.06 = VERY CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = VERY GRAY.
8/ XXX.00 = SOGGY, XXX.10 = THICK WHITE OR MARSH, SLIGHTLY CLOSE, XXX.03 = CLOSE, XXX.05 = OPEN CREAM, XXX.06 = OPEN, SLIGHTLY IRREGULAR, XXX.07 = IRREGULAR-OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = SLIGHTLY OPEN, IRREGULAR. XXX.50 = SLIGHTLY IRREGULAR-OPEN, XXX.70 = SLIGHTLY OPEN, XXX.90 = GOOD PROMISE, 4 = GOOD PROMISE.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

TABLE 3
QUALITY DATA FROM UNIFORM NURSERY SAMPLES   1979 CROP

VARIETY OR SEL. NO.	T.W. #/BU 1/	1000 KWT. G. 2/	KERNEL SIZE LG	MED	SM %	WHT. MIN. 2/ %	WHT. PRO. 2/ %	KERN. CHAR. 3/	FLR. EXT. %	FLR. MIN. 65%EX. 2/	FLR. PRO. %	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/ %	MIX. PAT. 5/	BAKE ABS. 2/ %	MIX. TIME MIN.	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC.	BAKE EVAL. 3/	GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY
WESTERN REGIONAL BLENDS																									
BUTE	61.9	29.9	24	73	3	1.53	14.6	4	69.1	0.33	14.0	1	2	65.7	5	65.5	3.30	3	100.5	88.09	905	4	3	8A	
CHRIS	59.9	28.4	22	73	5	1.56	15.7	5	65.6	0.33	15.0	1	3	67.0	5	67.4	3.75	3	101.0	87.09	1020	5	4		
ERA	60.5	28.8	23	73	4	1.56	14.3	5	70.4	0.36	13.5	1	3	64.2	5	64.1	4.50	3	101.0	86.05	1000	5	3	WP	8A
MARQUIS	60.4	30.6	26	71	3	1.60	15.2	2	69.1	0.34	14.2	1	2	66.3	5	67.8	3.75	3	102.8	86.05	1050	2	2		
WALDRON	59.9	32.6	38	59	3	1.59	15.2	2	69.4	0.34	14.6	1	6	67.3	6	67.8	2.50	3	102.0	87.05	1010	2	1		M65
MN 7222	59.9	28.8	23	73	4	1.55	14.1	4	70.7	0.34	13.2	1	2	64.4	5	64.8	4.00	3	101.0	90.59	970	4	3	WP 8A	
MN 7324	59.6	32.8	35	62	3	1.47	14.4	4	68.3	0.37	13.0	1	4	60.7	4	66.9	4.25	3	101.4	86.09	975	4	3	WP M65	
MN 7336	59.6	35.2	33	64	3	1.54	14.4	5	70.3	0.33	13.0	1	2	60.3	6	60.5	2.25	3	103.8	89.99	1030	8	3	OO	
MN 7378	60.2	33.2	28	67	5	1.52	13.8	5	70.3	0.33	13.1	1	2	63.7	6	63.8	2.50	4	103.8	87.99	1040	8	1	OO	
MN 73168	59.4	30.6	26	70	4	1.58	14.6	4	66.2	0.36	13.5	1	3	65.0	6	65.2	4.25	2	102.0	87.09	975	6	2	8A	8A
MT 7635	60.0	30.8	29	65	6	1.63	14.9	3	67.4	0.39	14.1	1	8	64.7	5	64.7	4.25	2	101.0	88.09	945	5	1	LG	M65 8A
MT 7648	59.7	28.7	18	76	6	1.60	14.9	4	67.7	0.37	14.1	1	4	65.0	7	65.2	3.00	2	100.0	85.09	985	2	4	M65 8A MT OO	
NO 550	60.8	31.4	28	69	3	1.57	15.1	2	67.1	0.35	13.8	1	4	66.3	6	66.8	3.75	2	100.0	89.09	985	2	4		
NO 565	60.6	31.4	24	72	4	1.54	15.1	2	67.6	0.36	13.6	1	3	67.3	6	68.0	3.25	2	101.0	89.09	1000	4	4		
NO 567	61.9	32.6	32	66	2	1.53	16.0	2	67.5	0.33	14.9	1	2	67.3	6	67.3	3.75	2	101.0	85.07	1015	4	3	OO	
NO 569	60.1	35.6	43	55	2	1.57	14.6	3	68.3	0.34	13.5	1	3	64.7	5	64.5	3.25	3	102.8	86.07	985	4	3	8A	
NO 571	61.1	31.5	36	61	3	1.55	15.0	2	65.0	0.36	14.6	1	2	66.3	5	67.0	3.50	4	100.0	90.07	1050	5	3	OO	
NHS 183-74	59.5	33.2	22	73	5	1.45	13.1	2	69.2	0.35	12.7	1	2	63.2	5	66.0	4.00	3	101.5	88.09	950	2	1	WP	WP 8A
NHS 1001-75	60.9	28.7	25	75		1.50	13.9	5	70.6	0.37	12.9	1	3	61.9	4	61.7	3.50	3	102.0	90.59	985	8	1	M65	8A
NK 755S511-4	60.7	32.1	26	69	5	1.60	14.4	4	70.6	0.38	13.4	1	4	64.2	6	64.4	4.50	2	102.7	88.07	985	5	2	WP M65	
RL 4314	59.3	32.4	16	76	8	1.58	15.6	4	68.0	0.37	15.0	1	3	65.7	4	64.5	2.50	3	102.7	88.09	1025	5	1	KW LG	8A
50 2355	60.1	30.2	29	68	3	1.49	14.6	3	69.0	0.37	13.9	1	4	65.7	4	66.0	2.50	5	100.0	89.99	980	2	1	M65	8A OC
MA 6307	60.5	30.5	15	81	4	1.43	13.2	8	65.7	0.35	12.3	1	4	63.2	5	63.5	3.75	5	103.00	88.99	935	8	1	SM LG	
WA 6510	60.8	30.5	26	70	4	1.50	13.4	5	70.4	0.36	12.2	1	1	62.5	5	62.5	4.00	3	102.0	88.09	910	8	1		WP 8A
WA 6511	60.3	31.4	20	76	4	1.46	13.6	6	70.1	0.35	12.6	1	2	63.7	4	63.5	3.75	3	102.0	88.09	970	8	1		WP 8A
WSMP 122	59.5	28.2	15	80	5	1.45	13.6	7	67.7	0.39	12.6	2	2	65.7	4	65.5	2.50	5	101.0	87.09	905	8	1	LG	WP 8A M65 OO

1/ CLEAN DRY - SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE-SATISFACTORY, 5 = QUESTIONABLE, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = SOFT, 5 = GRITTY, 6 = VERY SOFT.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN. (1 = VERY WEAK --- 11 = VERY STRONG)
6/ XXX.0 = VERY ELASTIC, 1 = ELASTIC, 2 = ELASTIC-PLIABLE, 3 = SLIGHTLY ELASTIC, 4 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK, 20 = SLIGHTLY OEAO. 30 = OEAO.
7/ XXX.X0 = BRIGHT WHITE, XXX.0 = WHITE, XXX.1 = SLIGHTLY CREAMY, XXX.5 = CREAMY, XXX.6 = BRIGHT CREAMY, XXX.8 = CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = VERY GRAY.
8/ XXX.00 = 50GY, XXX.01 = THICK WALL OR HARSH, XXX.03 = CLOSE, XXX.05 = OPEN, XXX.06 = OPEN-SLIGHTLY IRREGULAR, XXX.07 = IRREGULAR-OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = SLIGHTLY OPEN-IRREGULAR, XXX.50 = SLIGHTLY IRREGULAR-OPEN, XXX.70 = SLIGHTLY IRREGULAR, XXX.90 = OPEN, XXX.99 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

TABLE 4

QUALITY DATA OF UNIFORM REGIONAL NURSERY BLENDS

VARIETY OR SEL. NO.	T.W. #/BU. 1/	1000 KWT. GG.	KERNEL SIZE LG	MED	SM %	WHT. MIN. 2/	WHT. PRO. 2/ %	KERN. CHAR. 3/	FLR. EXT. %	FLR. MIN.a 65%EX %	FLR. PRO. CHAR. 4/ %	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/ %	MIX. PAT. 5/	BAKE ABS. 2/ %	MIX. TIME MIN.	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC.	BAKE GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY
REGIONAL AVERAGES OF BUTTE, CHRIS AND WALDRON FOR 1979																								
WESTERN	60.6	30.3	28	69	3	1.56	15.2	3	69.4	0.35	14.5	1	4	66.7	5	66.8	3.50	3	100.8	87.41	978	3	SM	
NORTHEASTERN	59.6	32.1	43	55	2	1.68	14.6	3	70.2	0.38	13.6	1	2	65.1	5	65.3	3.50	3	101.2	89.02	932	4	M65	
SOUTHEASTERN	60.3	31.1	36	61	2	1.81	13.7	3	69.9	0.40	12.7	1		63.7	4	63.7	3.50	3	101.7	87.08	918	4	SM WP	M65
REGIONAL AVERAGES FOR 1979																								
WESTERN	60.3	31.0	26	70	4	1.54	14.6	5	69.0	0.36	13.7	1	3	65.2	5	65.4	3.75	3	101.4	87.85	989	5	SM M65	
NORTHEASTERN	59.3	32.4	41	56	3	1.67	13.6	5	70.3	0.39	12.6	1	3	63.9	5	64.3	4.00	4	101.6	88.65	923	2	SM WP M65	8A
SOUTHEASTERN	59.8	31.8	34	63	3	1.77	12.8	5	69.7	0.41	11.9	1	3	62.4	5	62.7	4.25	3	101.8	88.20	920	3	SM WP M65	8A
CROP YEAR AVERAGES																								
1977 AVERAGE	60.9	34.4	28	68	4	1.63	14.6	5	70.8	0.39	13.5	1	2	64.4	4	65.4	3.50	4	100.6	88.79	916	3	SM M65	
1978 AVERAGE	59.8	34.9	36	60	4	1.75	14.3	5	70.7	0.40	13.6	1	3	63.0	5	63.7	3.25	4	101.4	87.24	935	2	SM M65	
1979 AVERAGE	59.7	31.7	34	63	3	1.66	14.2	5	69.7	0.39	13.7	1	3	63.8	5	64.1	4.00	3	101.6	88.23	944	5	SM M65	8A
1977-79 AVG	60.2	33.7	33	63	4	1.68	14.2	5	70.4	0.39	13.3	1	3	63.7	5	64.4	3.50	4	101.2	88.09	932	2	SM M65 8A	8A

1/ CLEAN DRY.— SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE, 5 = QUESTIONABLE-SATISFACTORY, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = SOFT, 5 = GRITTY, 6 = VERY SOFT.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN. (1 = VERY WEAK --- 11 = VERY STRONG)
6/ 1 = BUCKY, 2 = VERY ELASTIC, 3 = ELASTIC, 4 = ELASTIC-PLIABLE, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK.
7/ XXX.9 = BRIGHT WHITE, XXX.8 = WHITE, XXX.7 = SLIGHTLY CREAMY, XXX.6 = BRIGHT CREAMY, XXX.5 = CREAMY, XXX.4 = VERY CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = VERY GRAY, XXX.0 = SLIGHTLY DEAD, 30 = DEAD.
8/ XXX.00 = SGG, XXX.05 = THICK WALL OR HARSH, XXX.06 = CLOSE, XXX.05 = OPEN, XXX.07 = IRREGULAR-OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = OPEN-IRREGULAR, XXX.50 = SLIGHTLY IRREGULAR-OPEN, XXX.70 = SLIGHTLY OPEN, XXX.90 = SLIGHTLY OPEN, XXX.99 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

VARIETY OR SEL. NO.	T.W. /1/ (#/BU.)	1000 KWT. /G./	KERNEL SIZE LG	MED	SM /%/	WHT. VIT. /2/	WHT. PRO. /2/	KERN. CHAR. /3/	FLR. EXT. /%/	FLR. MIN. @ 65% EX. /%/	FLR. PRO. /2/	MLG. CHAR. /4/	MLG. PEG. /3/	MIX. ABS. /2/	MIX. PAT. /5/	BAKE ABS. /2/	MIX. TIME /MIN./	DOUGH CHAR. /9/	CRUMB COLOR /2/	CRUMB GRAIN /8/	LOAF VOL. /CC./	BAKE EVAL. /3/	GEN. EVAL. /2/	MINOR DEFICIENCY	MAJOR DEFICIENCY
TORRINGTON, WYOMING																									
NUTTE	62.5	30.4	31	65	4	1.92	11.2	5	63.2	0.48	10.2	1	2	59.3	3	59.3	3.00	6	103.0	88.99	156	5	3	BA LV	WP
CHRIS	61.0	29.1	25	72	10	1.89	12.9	3	62.4	0.57	12.3	1	2	61.9	3	61.9	3.25	6	102.0	89.99	176	2	4	KW SM M65	
ERA	62.0	27.4	20	70	10	1.90	12.9	6	64.8	0.55	12.3	1	4	57.9	5	57.5	5.03	6	101.0	89.99	161	8	1	LG M65 MT	LG WP
MARQUIS	62.5	31.0	20	78	3	1.91	12.6	2	64.7	0.58	12.1	1	4	57.5	5	57.5	4.75	4	103.0	89.09	175	8	2	M65 BA DO	WP BA
WALDRON	61.0	32.4	41	56	3	2.01	13.5	2	61.8	0.60	12.9	1	4	62.3	4	62.3	3.00	4	100.0	88.07	184	8	2	DO	BA
MN 7222	60.5	28.5	23	72	5	1.78	10.9	8	64.5	0.53	9.7	1	1	57.4	5	57.7	4.75	7	103.0	88.09	168	8	1	MT DO LV	WP BA
MN 7324	61.5	32.9	37	61	2	1.74	10.8	4	61.2	0.54	10.0	1	2	59.7	5	57.7	2.25	6	103.6	87.99	158	8	1	MT BA	WP BA
MN 7336	60.0	34.1	36	60	4	1.84	10.8	8	65.2	0.51	11.0	1	4	59.7	7	58.7	2.25	6	101.0	89.99	155	7	2	WP DO LV	
MN 7378	60.0	30.3	23	60	5	1.77	10.6	8	62.2	0.48	10.4	1	2	59.3	2	58.0	5.00	6	105.9	88.09	155	6	1	MT LV OO	WP LV
MN 7316B	60.0	29.8	41	54	3	1.76	10.8	8	62.7	0.60	9.9	1	4	58.3	5	58.3	5.00	6	103.0	88.09	162	8	3	LG M65 MT	WP BA
MT 7635	61.0	31.2	34	62	4	1.93	11.3	5	59.6	0.70	10.6	1	8	58.7	3	58.7	3.25	30	102.6	89.99	166	8	1	EX WP M65	WP M65
MT 764B	61.0	27.6	27	88	8	1.94	11.6	8	58.3	0.58	11.0	1	8	58.7	9	57.7	7.50	6	103.8	89.07	161	8	1	MT WP	LG EX
ND 565	63.0	30.3	24	74	2	1.84	12.1	2	60.3	0.55	11.3	1	3	60.0	6	60.0	4.00	6	101.0	89.10	170	4	2	LG BA LV	BA
ND 567	64.0	32.9	43	55	2	1.79	12.3	2	61.6	0.54	11.2	1	3	62.8	5	62.3	5.00	6	101.0	87.05	157	4	3	MT LV	
ND 569	60.0	35.3	37	60	3	1.98	11.8	4	62.5	0.53	10.9	1	2	59.0	3	59.0	4.25	6	103.0	86.09	173	4	3	WP BA	
ND 570	60.5	33.9	30	66	4	1.87	11.7	4	63.5	0.52	10.5	1	2	59.7	6	60.7	3.25	6	103.0	87.07	168	4	3	BA	WP BA
ND 571	59.5	30.0	40	88	7	1.74	11.0	6	62.7	0.45	10.8	1	1	59.7	4	59.0	4.75	6	103.0	88.00	164	6	1	TW NT	
NHS 183-74	60.5	25.8	9	86	7	1.76	11.0	8	68.1	0.49	9.9	1	1	55.4	5	55.4	5.50	6	102.0	86.09	160	8	1	KW SM MT	BA
NHS 1001-75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		8A LV
NK755 5511-4	63.0	34.1	31	65	4	1.84	11.3	5	64.8	0.53	10.4	1	5	57.5	3	57.5	3.50	6	101.0	86.05	170	8	1	KW M65	WP
SD 2355	60.0	26.3	18	86	6	1.72	13.7	8	65.0	0.47	9.6	1	1	59.0	4	59.0	2.75	5	102.0	88.09	155	5	1	LG DO	EX
WSMP 122	61.0	29.0	12	78	4	1.70	10.2	8	61.9	0.55	8.8	1	3	57.9	2	57.8	3.00	7	103.6	88.99	145	8	3	PD OO LV	WP LV
WILLISTON, NORTH DAKOTA																									
1979 STD	58.7	32.3	50	48	2	1.66	16.9	5	63.0	0.52	14.3	1	2	62.8	5	62.8	4.50	4	100.0	84.01	197	2	4	KW SM DO	LG
COTEAU	59.5	25.6	93	48	4	1.41	16.5	2	65.0	0.52	16.3	1	1	67.0	6	67.0	5.50	3	100.6	84.01	184	4	4	KW SM MT	LG
OLAF	59.5	28.2	10	86	4	1.37	15.7	8	63.9	0.39	14.7	1	1	66.3	7	66.3	6.25	3	100.0	87.07	189	5	1	KW KW DO MT	DO
PULLMAN, WASHINGTON																									
1979 STD	58.7	32.3	50	48	2	1.66	15.4	2	63.7	0.52	14.3	1	2	62.8	5	62.3	4.00	4	100.0	88.09	197	2	4	DO SM	WP BA
BORAH	59.0	34.5	42	56	2	1.42	13.0	6	62.3	0.35	13.4	1	1	63.7	7	63.7	3.25	4	102.8	88.09	192	4	3	LG	WP DO
SANTELL	57.5	32.1	28	50	4	1.38	13.0	8	45.2	0.27	12.6	4	8	60.2	8	60.7	2.50	6	103.1	83.09	161	7	1	SM MT	BA OO LV
URQUIE	57.0	32.1	20	54	1	1.39	12.0	8	46.2	0.53	12.3	1	1	61.6	5	61.6	5.25	6	102.5	85.01	157	7	1	8A	EX OO LV
WAMPUM	57.5	32.6	43	43	3	1.39	12.8	8	64.2	0.40	12.3	4	1	61.6	5	61.6	5.75	6	102.5	85.01	167	7	1	8A	WP DO
WARED	59.0	29.2	28	67	5	1.41	12.8	8	66.8	0.41	12.2	1	1	61.3	5	61.3	4.75	5	101.0	89.99	172	7	1	KW LG SM 8A DO LV	WP
ABERDEEN, IDAHO																									
1979 STD	58.7	37.3	50	48	2	1.66	15.4	2	63.7	0.52	14.3	1	2	62.8	5	62.8	4.00	4	100.0	86.09	197	2	5	OO LV	WP
BORAH	63.0	33.6	39	58	3	1.63	12.5	8	63.9	0.45	12.6	1	2	64.2	4	64.2	3.25	5	102.5	90.09	180	5	1	LV	
BONNERS FERRY, IDAHO																									
1979 STD	58.7	32.3	50	48	2	1.66	15.4	2	63.7	0.52	14.3	1	2	62.8	5	62.8	4.00	4	100.0	88.09	197	2	4	DO	DO
NO S47	61.0	34.6	47	50	1	1.52	15.6	5	58.0	0.44	15.1	1	2	62.7	6	66.2	4.50	2	101.8	87.07	191	4	3		WP BA
NO S51	60.0	35.7	45	53	2	1.56	15.7	5	58.5	0.48	13.9	1	8	66.6	5	66.6	3.50	3	101.8	89.09	192	4	1	DO	EX

1/ CLEAN DRY - SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE-SATISFACTORY, 5 = QUESTIONABLE, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL-SOFT, 2 = SOFT-NORMAL, 3 = NORMAL, 4 = SOFT, 5 = GRITTY, 6 = VERY SOFT, 7 = VERY STRONG)
5/ R = REFERRED TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN, 1 = ELASTIC, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = DEAD.
6/ 1 = BUCKY, 9 = VERY MELASTIC, XXX.9 = WHITE, XXX.8 = WHITE, XXX.7 = SLIGHTLY CREAMY, XXX.6 = BRIGHT CREAMY, XXX.5 = VERY CREAMY, 20 = SLIGHTLY DEAD, 30 = DEAD.
7/ XXX.9 = BRIGHT WHITE, XXX.8 = WHITE, XXX.7 = SLIGHTLY CREAMY, XXX.6 = BRIGHT CREAMY, XXX.5 = VERY CREAMY, XXX.4 = VERY CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = VERY GRAY.
8/ XXX.00 = SOGGY, XXX.01 = THICK WALL OR HARSH, XXX.03 = CLOSE, XXX.05 = OPEN, XXX.06 = OPEN, IRREGULAR, XXX.07 = IRREGULAR-OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = SLIGHTLY OPEN, IRREGULAR, XXX.50 = SLIGHTLY IRREGULAR-OPEN, XXX.70 = SLIGHTLY OPEN, XXX.90 = SLIGHTLY IRREGULAR, XXX.99 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

VARIETY OR SEL. NO.	T.W. 1/ #/BU. /G/	1000 KWT.	KERNEL SIZE LG	MED	SM	WHT. MIN. %	WHT. PRO. %	KERN. CHAR. 3/	FLR. EXT. %	FLR. MIN-0 65%EX.	FLR. PRO. %	MLG. CHAR. 9/	MLG. PER. %	MIX. ABS. %	MIX. PAT. 5/	BAKE ABS. %	MIX. TIME MIN.	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. EVAL. CC.	BAKE VOL. EVAL. 3/	GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY

WILLISTON, NORTH DAKOTA

Variety	Data
ANGUS	
B-1	
BUTTE	
COTEAU	
ELLAR	
ERA	
EUREKA	
JAMES	
KITT	
LEN	
LEW	
NEWANA	
OLAF	
PRODAX	
SINTON	
SOLAR	
THATCHER	
TIOGA	
WALDRON	
WARED	
MN 70170	
MT 709	
MT 7416	
ND 550	
ND 565	
ND 566	
ND 567	
ND 568	
ND 569	
ND 570	
ND 571	
ND 572	
NK 755511-4	
SU 28-1	
SU 56	

1/ CLEAN DRY - SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE-UNSATISFACTORY, 5 = QUESTIONABLE, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = VERY SOFT, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = NORMAL, 5 = SOFT+NORMAL, 6 = QUESTIONABLE-SATISFACTORY.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN. 11 = VERY WEAK --- 1 = VERY STRONG)
6/ 1 = BUCKY, 2 = VERY ELASTIC, 3 = ELASTIC, 4 = ELASTIC-PLIABLE, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK.
7/ XXX.9 = VERY WHITE, XXX.8 = WHITE, XXX.7 = SLIGHTLY CREAMY, XXX.6 = BRIGHT CREAMY, XXX.5 = CREAMY, XXX.4 = VERY CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = GRAY, XXX.0 = SLIGHTLY GRAY.
8/ XXX.00 = SUGARY, XXX.01 = THICK WALL OR HARSH, XXX.05 = OPEN, IRREGULAR, XXX.06 = OPEN, SLIGHTLY IRREGULAR, XXX.07 = IRREGULAR, OPEN, XXX.09 = OPEN, XXX.30 = SLIGHTLY OPEN, IRREGULAR, XXX.50 = SLIGHTLY IRREGULAR OPEN, XXX.70 = SLIGHTLY OPEN, XXX.10 = IRREGULAR, XXX.99 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

TABLE 7

QUALITY DATA ON FIELD PLOT NURSERY SAMPLES 1975 CREP

VARIETY OR SEL. NO.	T.W. #/BU.	1000 KNL. G.	KERNEL SIZE LG MED SM %	WHT. MIN. %	WHT. PRO. %	KERN. CHAR.	FLR. EXT. %	FLR. MIN. ASH %	FLR. PRO. %	FLK. CHAR.	MLG. CHAR. PER.	MIX. ABS. %	MIX. PAT.	BAKE ABS. %	MIX. TIME MIN.	DOUGH CHAR.	CRUMB COLOR	CRUMB GRAIN	LOAF VOL. EVAL. CC.	BAKE EVAL.	GEN. EVAL.	MINOR DEFICIENCY	MAJOR DEFICIENCY
MADISON, WISCONSIN																							
ANGUS	59.5	35.7	63 36 1	1.68	13.5	2	70.7	0.36	12.2	1	5	60.0	6	59.5	4.75	5	104.0	88.07	895	3	3	BA	M65
BUTTE	60.5	35.2	54 48 2	1.67	14.1	3	71.0	0.30	12.8	1	2	62.5	6	62.3	3.50	5	102.8	86.07	860	4	3	OO	M65
COTEAU	59.5	35.5	54 44 2	1.69	13.7	3	71.3	0.39	12.8	1	8	60.8	5	63.0	4.00	4	102.8	85.09	850	3	1	KW LG OO	M65
ELLAR	59.5	37.0	72 27 1	1.71	13.3	3	71.3	0.39	12.9	1	8	59.3	5	63.6	4.00	7	102.8	85.09	870	6	1	BA OO	M65
ERA	59.5	33.8	50 48 2	1.65	11.8	8	72.8	0.37	10.5	1	8	55.7	6	60.0	4.50	4	102.8	87.05	780	1	1	KW OO	WF M65
EUREKA	58.0	36.1	69 30 1	1.65	13.3	4	72.3	0.41	12.1	1	8	56.3	6	56.7	6.00	7	102.9	85.05	855	8	1	TW OC	M65 BA
LATHROP	57.0	37.0	50 45 1	1.68	13.7	8	73.4	0.35	9.7	1	4	57.0	6	55.3	4.25	6	104.5	89.60	795	8	1	TW M65 OO	BF BA
LEN	58.0	35.6	70 27 3	1.62	13.0	3	71.3	0.36	11.5	1	4	58.7	8	69.1	7.25	7	102.8	86.05	810	4	1	WP OC	M65
OLAF	59.0	36.5	68 30 2	1.69	13.5	8	71.3	0.36	11.6	1	3	58.7	8	58.3	3.50	5	102.8	83.05	790	6	2	M65 BA OC	M65
MN 70170	59.0	33.7	51 47 2	1.68	10.6	8	72.3	0.34	9.5	1			3	56.3			101.8	87.05	785	4	1	KW M65 BA	WP

1/ CLEAN DRY — SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W..
2/ 14% MOISTURE BASIS..
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE, 5 = QUESTIONABLE-SATISFACTORY, 6 = QUESTIONABLE, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = SOFT, 5 = GRITTY, 6 = VERY SOFT, VERY SOFT.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CORE PATTERN. (1 = VERY WEAK, 6 = VERY STRONG)
6/ XXX.9 = VERY ELASTIC, 3 = ELASTIC, 4 = SLIGHTLY ELASTIC, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK, 20 = SLIGHTLY DEAD, 30 = DEAD.
7/ XXX.9 = BRIGHT WHITE, XXX.8 = WHITE, XXX.7 = SLIGHTLY CREAMY, XXX.6 = BRIGHT CREAMY, XXX.5 = CREAMY, XXX.4 = VERY CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = VERY GRAY.
8/ XXX.00 = SOGGY, XXX.01 = THICK WALL OR HARSH, XXX.02 = SLIGHTLY CLOSE, XXX.03 = OPEN, IRREGULAR, XXX.06 = OPEN, SLIGHTLY IRREGULAR, XXX.07 = IRREGULAR OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = SLIGHTLY OPEN, IRREGULAR.
XXX.50 = SLIGHTLY IRREGULAR OPEN, XXX.70 = SLIGHTLY OPEN, XXX.90 = OPEN, XXX.99 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

TABLE 8

QUALITY DATA ON INTERNATIONAL SAWFLY NURSERY SAMPLES   1975 CRCF

VARIETY OR SEL. NO.	T.W. 1/ #/BU.	1000 KWT. G.	KERNEL SIZE LG	MED	SM	WHT. MIN. 2/	WHT. PRO. 2/	KERN. CHAR. 3/	FLR. EXT.	MIN. 65EX. 2/	FLR. PRO. EXT.	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/	MIX. PAT. 5/	BAKE ABS. 2/	MIX. TIME MIN.	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC.	BAKE EVAL. 3/	GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY
FARGO, NORTH DAKOTA																								
CHRIS	60.0	25.4	8	85	5	1.75	15.7	3	64.6	0.44	15.5	1	2	65.7	5	65.7	4.75	5	103.0	88.09	185	2	4	KW	
FORTUNA	58.0	26.1	9	85	6	1.66	15.3	4	64.0	0.49	15.0	1	2	65.7	5	65.7	4.80	5	100.0	87.05	195	2	4	LG	
LEW	56.0	28.5	17	78	5	1.87	15.1	2	64.9	0.51	15.1	1	3	67.6	8	65.6	6.75	4	101.5	86.09	195	2	2	LG	LG M65
THATCHER	56.0	28.0	5	79	6	1.86	14.9	8	64.9	0.54	15.1	1	2	64.2	4	64.2	6.76	5	100.5	88.05	207	2	3	OK	
TIOGA	55.5	33.6	43	55	2	1.86	15.0	2	64.3	0.45	14.4	1	2	65.0	5	65.0	4.25	5	101.0	88.99	191	2	4	OX	
WALDRON	59.5	30.8	40	58	2	1.86	14.3	4	64.5	0.49	14.1	1	2	64.2	5	64.2	4.00	5	100.5	88.01	175	4	3	WP	LV
MT 766	58.0	37.8	19	78	4	1.69	14.7	2	64.0	0.43	13.5	1	2	65.8	7	65.8	4.50	5	101.8	85.10	191	4	2	WP	OC
MT 783	58.0	31.0	3	68	4	1.69	14.7	2	63.2	0.49	13.5	3	5	67.0	6	66.0	4.50	5	102.5	85.09	191	4	4	TW SM	SM WM EX M65
MT 7620	57.0	23.1	4	60	2	1.58	15.1	2	61.2	0.52	14.4	3	8	67.0	6	67.0	5.25	5	101.0	85.07	207	2	1	TW WM	WM BA EX MT
MT 7732	56.5	30.5	28	70	5	1.59	14.3	5	59.3	0.55	14.0	1	8	63.5	7	63.5	7.25	5	100.0	88.09	185	5	1	TW	
MT 7810	55.0	20.5	1	73	26	2.07	14.5	8	60.1	0.56	13.2	1	8	66.3	8	66.3	7.00	5	102.0	88.09	206	3	1	WP	MT
SU 7*5*-3	60.5	27.8	20	68	6	1.71	13.1	2	67.4	0.42	14.5	1	1	66.3	4	66.3	4.00	5	102.6	85.59	172	3	1	WP	LV
SU 20*5*-1	60.5	33.0	22	72	2	1.85	13.8	4	62.7	0.47	13.2	1	1	64.2	5	64.2	3.50	4	101.0	85.01	182	4	3	WP	OC
SU 56	61.0	33.2	42	56	2	1.85	13.8	4	62.7	0.47	14.5	1	1	64.2	7	64.2	5.00	4	101.0	85.09	185	4	3	OC	
SU 57	60.5	31.2	40	57	3	1.87	15.3	2	66.4	0.43	14.5	1	1	64.2	7	64.2	5.00	4	102.0	85.10	178	4	3	OC	LV
7748-2768	58.0	24.3	4	87	9	1.94	14.4	8	64.6	0.47	14.0	2	2	62.8	4	62.8	4.25	6	101.5	86.01	183	7	1	KW	LG BA
MINOT, NORTH DAKOTA																								
CHRIS	60.5	29.2	27	70	3	1.53	15.7	3	64.5	0.41	15.5	1	2	67.5	6	67.9	5.00	3	101.0	88.09	200	2	4	KW	LG
FORTUNA	60.5	33.8	45	53	2	1.57	15.4	2	66.5	0.43	15.0	1	3	67.0	5	67.0	4.00	3	103.5	88.05	209	2	4	M65	MT
LEW	58.0	35.0	39	58	3	1.47	15.4	2	66.0	0.43	15.7	1	3	67.3	6	67.3	7.75	3	103.0	88.07	200	2	3	KW	MT
THATCHER	58.0	29.2	30	67	3	1.48	15.3	3	65.6	0.43	15.7	1	3	67.9	5	67.9	2.75	3	104.0	87.07	195	2	4	KW	
TIOGA	59.0	35.8	48	50	2	1.61	16.4	2	63.8	0.42	16.2	1	2	67.9	6	67.9	4.00	3	104.5	85.07	202	2	4	KW	
WALDRON	58.0	35.2	57	41	2	1.60	15.7	2	65.6	0.41	15.2	1	2	67.0	6	67.0	5.50	3	101.0	86.07	195	2	4	TW	LG MT
MT 766	59.0	29.0	15	81	4	1.46	15.5	4	64.9	0.40	14.9	1	2	67.3	6	67.3	8.75	3	103.0	85.05	185	4	3	KW	MT
MT 783	59.0	29.0	11	90	4	1.37	16.6	4	64.0	0.44	14.9	2	2	67.6	8	67.6	7.75	3	100.0	85.09	210	3	2	KW	MT
MT 7620	56.0	27.0	15	90	4	1.48	16.0	6	61.6	0.40	16.4	2	4	67.6	8	67.6	6.25	3	100.0	83.07	210	3	2	TW	EX
MT 7732	57.0	34.6	56	42	2	1.67	17.0	3	61.8	0.42	16.8	2	4	67.9	8	67.9	6.25	3	101.0	80.07	217	8	1	TW	MT
MT 7810	58.0	27.2	5	89	6	1.45	15.4	8	65.9	0.43	15.0	2	2	66.6	10	66.6	11.25	3	101.0	90.59	201	8	1	KW	LG MT
SU 7*5*-3	58.0	30.4	50	48	2	1.43	15.3	4	64.1	0.35	14.7	2	2	64.2	6	64.2	5.50	3	101.0	86.07	187	8	1	KW	BA
SU 20*5*-1	58.5	30.9	36	62	2	1.45	16.6	4	66.0	0.43	16.1	2	2	67.5	5	67.5	4.00	4	100.0	86.05	208	4	3	KW	
SU 56	59.0	33.1	44	52	3	1.49	16.3	4	64.8	0.42	14.9	1	2	66.3	6	66.3	6.50	4	100.0	84.05	206	4	3	OC	
SU 57	60.0	34.0		62	3	1.49	16.3	2	64.8	0.42	15.8	1	2	66.3	6	66.3	5.75	4	100.7	24.05	100	4	3	LV	
7748-2768	60.0	30.3	26	70	4	1.44	16.0	3	66.5	0.38	15.4	1	1	67.0	7	67.0	7.75	3	102.0	82.05	201	4	3	KW	LG MT

1/ CLEAN CRY.- SUBTRACT 1 LB./BU. FCR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SAT.; 2 = SATISFACTORY; 3 = SATISFACTORY-QUESTIONABLE; 4 = QUESTIONABLE; 5 = QUESTIONABLE-SATISFACTORY; 6 = QUESTIONABLE-UNSATISFACTORY; 7 = UNSATISFACTORY-QUESTIONABLE; 8 = UNSATISFACTORY.
4/ 1 = ACRMAL; 2 = ACRMAL-SCFT; 3 = SCFT-NCRMAL; 4 = VERY SCFT.; 5 = GRITTY; 6 = VERY SCFT.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN. (1 = VERY STRONG)
6/ 1 = BUCKY; 2 = VERY ELASTIC; 3 = ELASTIC; 4 = ELASTIC-PLIABLE; 5 = PLIABLE; 6 = PLIABLE; 7 = PLIABLE-WEAK; 8 = WEAK; 9 = WEAK; 10 = VERY WEAK; 11 = VERY WEAK; 20 = SLIGHTLY DEAD; 30 = DEAD.
7/ XXX.00 = BRIGHT WHITE; XXX.01 = BRIGHT WHITE; XXX.03 = SLIGHTLY CREAMY; XXX.05 = CREAMY; XXX.06 = BRIGHT CREAMY; XXX.4 = VERY CREAMY; XXX.5 = CREAMY; XXX.1 = DULL GRAY; XXX.4 = DULL GRAY; XXX.9 = GRAY.
8/ XXX.50 = 50GY WHITE; XXX.70 = HARSH; XXX.70 = HARSH, THICK WALL OR HARSH; XXX.05 = CLOSE; XXX.56 = CPEN; XXX.96 = OPEN; XXX.07 = IRREGULAR-OPEN; XXX.09 = OPEN; XXX.10 = IRREGULAR; XXX.20 = IRREGULAR; XXX.30 = SLIGHTLY OPEN-IRREGULAR.
    XXX.50 = SLIGHTLY IRREGULAR-OPEN; XXX.70 = SLIGHTLY OPEN-HARSH; XXX.96 = OPEN; XXX.99 = NORMAL.
9/ 1 = NO PROMISE; 2 = LITTLE PROMISE; 3 = SCME PROMISE; 4 = GOCC PROMISE.

TABLE 9   1979 CROP

QUALITY DATA ON INTERNATIONAL SAWFLY NURSERY SAMPLES

VARIETY OR SEL. NO.	T.W. 1/	1000 KWT. 6/	KERNEL SIZE LG	MED	SM	WHT. MIN. 2/	WHT. PRO. 2/	KERN. CHAR. 3/	FLR. EXT.	FLR. MIN. 65% EX.	FLR. PRO.	MLG. CHAR. 9/	MLG. PER. 3/	MIX. ABS. 2/	MIX. PAT. 5/	BAKE ABS. 2/	MIX. TIME MIN.	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC.	BAKE EVAL. 3/	GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY
WILLISTON, NORTH DAKOTA																									
CHRIS	58.5	22.3	4	89	7	1.46	16.0	4	66.7	0.42	15.8	1	2	67.9	6	67.9	4.75	3	101.5	88.09	201	2	4	KM	LG
FORTUNA	60.5	33.0	16	81	3	1.44	15.0	3	69.0	0.42	14.5	1	2	66.3	6	66.3	5.00	3	102.0	86.07	195	2	4	LG MGS	
LEW	59.5	27.9	6	85	7	1.44	16.0	3	67.3	0.46	15.7	1	4	67.3	9	67.3	10.50	3	101.0	85.10	207	8	1	KM MGS BA	MT
THATCHER	57.5	22.3	8	87	8	1.44	16.9	4	67.9	0.45	15.7	1	4	67.3	5	67.3	4.75	3	102.0	85.05	205	2	2	OO	LG
TIOGA	58.5	29.8	23	73	4	1.51	16.3	2	66.8	0.41	15.9	1	2	67.3	6	67.3	4.75	4	101.0	82.07	197	4	3		
WALDRON	58.2	28.8	15	82	3	1.48	16.0	2	67.9	0.39	15.6	1	2	66.0	7	66.0	5.25	3	100.0	89.99	197	2	4	MT	LG
MT 766	58.5	26.7	5	88	7	1.42	15.7	3	65.7	0.37	14.8	1	2	65.7	7	65.7	8.50	3	102.8	88.05	203	3	3	KW	LG
MT 763	59.0	24.2	7	86	7	1.41	15.7	8	66.2	0.40	15.0	1	4	66.3	8	66.3	7.00	3	102.0	85.05	206	3	3	TB SM	LG
MT 7732	57.5	29.5	25	72	15	1.43	15.8	8	64.9	0.41	15.6	3	3	65.7	7	65.7	7.25	3	103.7	84.07	205	1	3	MT MT	EX
MT 7810	58.0	24.4	19	80	19	1.47	15.2	8	67.9	0.44	14.5	1	3	67.9	9	67.9	11.50	3	101.0	86.59	195	8	1	KW	LG SM MT
SU 7#S-3	58.0	25.9	12	85	10	1.36	15.4	4	67.0	0.37	15.2	1	2	69.0	6	69.0	5.05	3	101.0	86.09	205	2	4	KM	
SU 28#S-1	60.0	22.9	17	83	3	1.48	15.9	3	65.5	0.44	15.4	1	3	67.0	5	67.0	6.00	3	101.0	88.07	192	2	4	KW LG SM	
SU 56	59.5	26.2	11	82	7	1.51	16.7	3	67.6	0.37	16.4	2	2	67.6	8	67.6	9.25	3	101.5	86.05	181	4	3	KW MT LV	
7748-2768	61.5	28.6	6	89	5	1.39	15.3	3	65.1	0.42	14.5	3	3	64.7	6	64.7	5.75	5	101.0	87.07	181	7	2	LG BA LV	OO

1/ CLEAN DRY - SUBTRACT 1 L8./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS-
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE-SATISFACTORY, 5 = QUESTIONABLE, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = SOFT, 5 = SOFT-NORMAL, 4 = SOFT, 5 = GRITTY, 6 = VERY SOFT.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERNS (1 = VERY WEAK-PLIABLE, 6 = VERY STRONG)
6/ 1 = VERY ELASTIC, 3 = ELASTIC, 4 = ELASTIC-PLIABLE, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK, 20 = SLIGHTLY DEAD, 30 = DEAD.
7/ XXX.9 = BRIGHT WHITE, XXX.8 = WHITE, XXX.7 = SLIGHTLY CREAMY, XXX.6 = BRIGHT CREAMY, XXX.5 = CREAMY, XXX.4 = VERY CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = VERY GRAY.
8/ XXX.00 = SOGGY, XXX.01 = THICK WALL OR MARSH, XXX.03 = CLOSE, XXX.05 = OPEN, XXX.06 = OPEN-IRREGULAR, XXX.07 = IRREGULAR-OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = SLIGHTLY OPEN-IRREGULAR.
XXX.50 = SLIGHTLY IRREGULAR-OPEN, XXX.70 = SLIGHTLY OPEN-IRREGULAR, XXX.90 = SLIGHTLY IRREGULAR-OPEN, XXX.59 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

TABLE 10

QUALITY DATA ON INTERNATIONAL SAWFLY NURSERY SAMPLES   1979 CROP

VARIETY OR SEL. NO.	T.W. #/BU. 1/	1000 KWT. G.	KERNEL SIZE LG	MED	SM	WHT. MIN. 2/	WHT. PRO. 2/	KERN. CHAR. 3/	FLR. EXT. %	FLR. MIN. 6%EX %	FLR. PRO. 2/ %	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/ %	MIX. PAT. 5/	BAKE ABS. 2/ %	MIX. TIME MIN.	DCLM CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC. 3/	BAKE EVAL. 3/	GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY
HAVRE, MONTANA																								
CHRIS	59.0	23.1	28	87	11	1.71	17.0	4	62.8	0.48	16.8	1	3	67.9	5	67.5	4.50	3	101.7	84.07	194	2	4	Kw	LG
FORTUNA	60.5	30.8	8	87	50	1.72	16.6	2	60.8	0.45	16.5	1	3	67.9	6	67.3	4.25	3	101.6	82.09	195	2	4	M65 BA NT	
LEW	60.5	26.3	4	86	10	1.74	16.4	4	63.0	0.52	16.0	1	3	66.3	5	66.3	7.25	3	103.6	83.07	196	4	2	M65 BA	LG
THATCHER	60.0	26.0	2	61	6	1.76	16.1	2	61.9	0.51	16.3	1	2	67.0	6	67.0	7.50	3	101.1	82.09	201	4	3	Kw	
TIOGA	55.0	26.7	5	90	3	1.75	17.3	2	62.2	0.46	17.0	2	2	67.5	6	67.5	4.25	2	100.0	88.05	200	4	4		
WALDRON	58.0	26.9	7	89	4	1.85	17.0	3	63.8	0.51	16.7	1	3	67.6	6	67.4	5.00	3	101.7	87.99	201	2	4	NH	M65
MT 766	58.0	24.6	2	87	11	1.71	16.6	3	60.7	0.43	16.4	1	2	67.6	8	67.2	7.00	3	104.7	84.05	201	4	3	NT BA NT	
MT 773	57.0	22.3	5	82	12	1.63	16.1	5	59.2	0.49	16.4	1	3	67.0	8	67.0	7.75	3	101.8	84.09	215	3	1	BA SM M65	
MT 7620	56.5	27.1	8	87	19	1.70	16.1	6	59.2	0.47	16.3	1	4	67.0	7	67.0	7.00	3	102.5	84.05	200	3	1	Tm KN NT	NT
MT 7732						1.69	17.0	3	60.1	0.51	16.8														
MT 7810	60.5	23.9	12	68	19	1.77	17.6	8	64.0	0.54	16.2	1	5	70.0	10	70.0	10.75	2	100.0	87.09	153	8	1	KN SM	LG M65
SU 57	57.5	23.6	8	88	10	1.61	18.0	5	61.0	0.48	17.8	1	3	67.9	7	67.9	6.50	3	100.7	88.07	209	4	1	Tm KN LG	LG M65
SU 7*SM-3	58.0	25.8	3	88	4	1.65	16.8	4	60.4	0.48	17.1	1	2	64.2	5	64.2	6.00	3	101.7	85.06	186	4	3	KP LG	BA
SU 28*SM-1	59.0	25.6	6	90	6	1.70	16.6	3	66.0	0.45	16.3	1	1	67.9	6	67.5	3.75	3	103.6	93.07	185	2	4	KP OO	
7749-2768	59.0	24.0	2	88	10	1.87	17.2	4	62.6	0.47	17.0	1	2	67.9	6	67.5	5.75	3	102.5	93.05	222	2	4	Kw WM	LG
SIDNEY, MONTANA																								
CHINOOK	61.0	27.5	7	88	5	1.60	16.0	4	65.0	0.43	15.4	1	2	64.7	6	64.7	5.50	3	102.9	86.07	211	4	3	KN BA	LG
CHRIS	60.0	35.8	3	84	2	1.61	15.6	4	64.9	0.42	15.4	1	2	67.0	5	67.0	4.00	3	102.0	86.09	181	2	3	Tm	LG
FORTUNA	62.0	31.5	34	64	2	1.57	15.1	2	66.5	0.43	15.4	1	2	66.3	7	66.3	6.00	3	102.0	87.05	198	2	4	NT	
LEW	61.0	26.1	5	93	4	1.59	16.2	6	64.6	0.51	15.6	1	6	65.0	4	65.0	4.25	4	101.0	87.09	189	4	1	KN	LG M65
THATCHER	60.0																							BA	
TIOGA	60.0	34.8	22	75	3	1.66	16.6	2	64.5	0.40	16.4	1	2	67.3	5	67.3	4.00	3	102.9	87.07	190	2	4	BA	LG
MT 766	60.0	32.1	3	63	4	1.67	15.6	3	63.5	0.43	14.7	1	2	65.7	4	65.7	4.00	3	103.8	87.07	202	3	3	Tm SM	KW
MT 783	59.0	27.5	6	88	6	1.49	15.1	6	66.5	0.40	14.7	1	3	66.3	7	66.3	6.25	3	103.8	85.09	196	3	1	KN SM	KW LG SM EX
MT 7620	58.0	23.5	1	84	15	1.61	16.0	8	61.4	0.43	15.7	1	5	66.0	7	66.7	6.75	3	101.8	86.07	203	3	1	Tm NT	
MT 7732	59.0	31.0	24	73	1	1.62	15.9	3	62.7	0.44	15.7	1	4	66.3	7	66.3	6.50	3	103.6	86.05	196	3	3	Tm NT	LG SM NT
MT 7810	61.0	27.3	2	88	10	1.70	15.1	6	66.2	0.45	14.4	1	2	67.6	8	67.6	5.75	3	101.8	88.09	188	2	4	KP WM	
SU 56	60.0	29.1	11	82	7	1.79	16.6	4	64.4	0.45	15.8	1	2	67.9	6	67.9	5.75	3	100.8	89.09	193	4	3	KN LG	
SU 57	61.0	30.5	18	76	6	1.79	16.4	4	66.8	0.41	16.4	1	3	64.7	9	64.7	7.25	3	101.5	85.09	192	6	3	KN BA	
SU 7*SM-1	59.0	28.2	20	78	2	1.55	15.4	4	63.2	0.36	15.2	1	3	64.7	5	64.7	4.25	4	102.5	87.07	183	2	3	Tm KN	LG OC
SU 28*SM-1	59.0	27.7	8	88	4	1.53	16.4	4	66.6	0.41	15.8	1	1	68.2	5	68.2	4.50	4	101.4	86.05	180	4	3	Tm KN	LG OO

1/ CLEAN DRY - SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SATISFACTORY. 2 = SATISFACTORY. 3 = SATISFACTORY-QUESTIONABLE. 4 = QUESTIONABLE. 5 = QUESTIONABLE-SATISFACTORY. 6 = QUESTIONABLE-UNSATISFACTORY. 7 = UNSATISFACTORY-QUESTIONABLE. 8 = UNSATISFACTORY.
4/ 1 = NORMAL. 2 = NORMAL-SOFT. 3 = SOFT=NORMAL.
5/ REFER TO REFERENCE MIXOGRAMS FOR NUMERICAL CURVE PATTERN. (1 = VERY WEAK -- 11 = VERY STRONG)
6/ 1 = BUCKY. 2 = VERY ELASTIC. 3 = ELASTIC. 4 = ELASTIC-PLIABLE. 5 = PLIABLE. 6 = PLIABLE-WEAK. 7 = PLIABLE-ELASTIC. 8 = WEAK-PLIABLE. 9 = WEAK. 10 = VERY WEAK. 20 = SLIGHTLY DEAD. 30 = DEAD.
7/ XXX.0 = BRIGHT WHITE. XXX.8 = WHITE. XXX.7 = SLIGHTLY CREAMY. XXX.6 = BRIGHT CREAMY. XXX.5 = CREAMY. XXX.4 = VERY CREAMY. XXX.3 = GRAY. XXX.2 = DULL GRAY. XXX.1 = GRAY. XXX.07 = IRREGULAR OPEN. XXX.09 = OPEN. XXX.10 = IRREGULAR. XXX.30 = SLIGHTLY OPEN-IRREGULAR.
8/ XXX.50 = SLIGHTLY IRREGULAR OPEN. XXX.70 = SLIGHTLY OPEN. XXX.03 = CLOSE. XXX.05 = OPEN. XXX.99 = NORMAL.
9/ 1 = NO PROMISE. 2 = LITTLE PROMISE. 3 = SOME PROMISE. 4 = GOOD PROMISE.

TABLE II

QUALITY DATA OF INTERNATIONAL SAWFLY NURSERY SAMPLES   1979 CROP

VARIETY OR SEL. NO.	T.W. 1/ BU.	1000 KWT. G.	KERNEL SIZE LG	MED	SM	WHT. MIN. 2/ %	WHT. PRO. 2/ %	KERN. CHAR. 3/	FLR. EXT. %	MIN.0 65%EX. %	FLR. PRO. 2/ %	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/ %	MIX. PAT. 5/	BAKE ABS. 2/ %	MIX. TIME MIN.	DOUGH CHAR. 6/	CRUMB COLOR 7/	CRUMB GRAIN 8/	LOAF VOL. CC.	BAKE EVAL. 3/	GEN. EVAL. 9/	MINOR DEFICIENCY	MAJOR DEFICIENCY
VARIETY AVERAGES																									
CHRIS	59.6	25.2	10	85	5	1.61	16.1	3	64.6	0.43	15.9	1	2	67.3	5	67.3	4.50	3	101.0	87.09	192	2	4	KW LG	
FORTUNA	59.7	32.4	17	79	4	1.63	15.7	2	66.9	0.45	15.4	1	2	67.0	5	67.0	4.25	3	101.0	87.05	198	2	4	MT	
LEW	60.1	29.6	16	78	6	1.62	15.8	4	66.5	0.47	15.5	1	4	67.3	8	67.0	8.00	3	102.8	87.07	204	2	3	KW LG	M65 8A
THATCHER	58.3	24.5	16	84	7	1.63	15.9	4	65.5	0.49	15.5	1	2	67.3	5	65.3	4.25	3	101.0	87.07	195	4	3	OO	
TIOGA	59.2	32.1	28	69	3	1.66	16.3	2	64.4	0.43	16.0	2	2	67.3	6	67.3	4.25	4	102.8	87.50	196	4	3	OO	
WALDRON	58.7	30.8	30	67	3	1.69	15.8	2	65.3	0.45	15.5	2	2	66.0	5	66.0	4.75	4	101.0	88.50	195	4	3	OO	
MT 766	57.9	28.2	9	85	6	1.57	15.3	5	63.4	0.41	14.9	1	2	65.0	7	65.7	7.50	3	103.9	88.30	192	3	3	LG	
MT 783	59.6	26.9	11	83	6	1.52	15.4	4	64.0	0.45	14.8	2	2	66.7	7	66.7	7.50	3	101.7	89.05	207	4	1	KW LG	LG
MT 7520	56.8	26.4	12	84	8	1.53	16.0	8	64.3	0.45	15.6	4	4	66.7	7	66.7	7.50	4	101.7	85.06	207	4	3	KW SM	OO SM EX MT
MT 7732	57.3	30.5	28	69	3	1.72	16.0	3	63.6	0.47	15.8	3	3	66.1	7	66.1	7.25	3	102.0	84.07	201	4	1	TW MT	
MT 7810	58.4	24.7	2	82	16	1.67	15.6	8	64.8	0.48	14.9	3	2	67.7	9	67.7	10.05	3	101.5	88.70	197	8	1	KW M65	LG SM MT
SU 7*5--3	58.6	27.4	23	73	4	1.55	15.2	4	66.0	0.43	15.7	1	2	67.2	5	67.2	4.25	3	101.5	88.07	184	5	3		8A
SU 28*5--1	59.4	27.4	19	78	3	1.57	16.1	2	66.6	0.43	15.3	1	1	67.6	9	66.4	5.25	4	101.0	85.05	193	4	3	KW OO	
SU 56	59.1	22.5	20	74	6	1.68	15.7	6	64.0	0.47	15.3	3	3	66.4	6	66.4	5.25	4	101.5	88.09	189	4	3	OO	
SU 57	59.2	29.2	23	71	6	1.71	16.6	2	66.2	0.42	16.2	1	1	66.8	7	66.8	6.75	3	101.5	85.07	192	4	3	MT	

1/ CLEAN DRY - SUBTRACT 1 LB./BU. FOR DOCKAGE-FREE T.W.
2/ 14% MOISTURE BASIS.
3/ 1 = VERY SATISFACTORY, 2 = SATISFACTORY, 3 = SATISFACTORY-QUESTIONABLE, 4 = QUESTIONABLE-SATISFACTORY, 5 = QUESTIONABLE, 6 = QUESTIONABLE-UNSATISFACTORY, 7 = UNSATISFACTORY-QUESTIONABLE, 8 = UNSATISFACTORY.
4/ 1 = NORMAL, 2 = NORMAL-SOFT, 3 = SOFT-NORMAL, 4 = SOFT, 5 = GRITTY, 6 = VERY SOFT.
5/ REFER TO REFERENCE MIKOGRAMS FOR NUMERICAL CURVE PATTERNS. (1 = VERY WEAK, 11 = VERY STRONG)
    1 = BUCKY, 2 = VERY ELASTIC, 3 = ELASTIC, 4 = ELASTIC-PLIABLE, 5 = PLIABLE-ELASTIC, 6 = PLIABLE, 7 = PLIABLE-WEAK, 8 = WEAK-PLIABLE, 9 = WEAK, 10 = VERY WEAK, 20 = SLIGHTLY DEAD, 30 = DEAD.
6/ XXX.9 = BRIGHT WHITE, XXX.8 = WHITE, XXX.7 = SLIGHTLY CREAMY, XXX.6 = BRIGHT CREAMY, XXX.5 = CREAMY, XXX.4 = VERY CREAMY, XXX.3 = GRAY, XXX.2 = DULL GRAY, XXX.1 = VERY GRAY.
7/ XXX.00 = SOGGY, XXX.01 = THICK WALL OR HARSH, XXX.03 = CLOSE, XXX.05 = OPEN, IRREGULAR, XXX.06 = OPEN, SLIGHTLY IRREGULAR, XXX.07 = IRREGULAR, OPEN, XXX.09 = OPEN, XXX.10 = IRREGULAR, XXX.30 = SLIGHTLY OPEN, IRREGULAR.
8/ XXX.50 = SLIGHTLY IRREGULAR-OPEN, XXX.70 = SLIGHTLY OPEN, XXX.90 = SLIGHTLY OPEN, IRREGULAR, XXX.99 = NORMAL.
9/ 1 = NO PROMISE, 2 = LITTLE PROMISE, 3 = SOME PROMISE, 4 = GOOD PROMISE.

TABLE 12

DATA FOR INTERNATIONAL NURSERY SAMPLES

ST. PAUL, MINNESOTA

VARIETY OR SEL. NO.	T.W. 1/ #/BU.	1000 KWT. G.	KERNEL SIZE LG %	MED %	SM %	WHT. MIN. 2/ %	WHT. PRO. 2/ %	KERN. CHAR. 3/	FLR. EXT. %	FLR. MIN.@65%EX. 2/ %	FLR. PRO. 2/ %	MLG. CHAR. 4/	MLG. PER. 3/	MIX. ABS. 2/ %	MIX. PAT. 5/
ABU-GHRAIB#3	59.5	27.8	12	82	6	1.90	13.7	8	62.8	0.73	12.7	2	8	63.8	4
ANAHUAC F75	58.5	35.7	39	57	4	1.89	12.8	4	64.5	0.63	12.1	1	8	60.3	6
ANTIZANA	58.0	34.0	54	43	3	2.13	13.8	3	63.0	0.59	13.2	1	8	61.9	5
BUCK BUCK"S"	61.0	32.6	59	37	4	1.91	12.6	4	63.0	0.58	11.4	1	6	62.3	3
COOK	60.5	29.7	21	72	7	1.83	12.5	5	59.8	0.49	12.1	1	8	63.8	4
CUCKOO "S"	60.0	30.4	26	65	5	1.76	13.2	3	58.3	0.52	11.6	1	8	63.5	5
DOUGGA 74	59.0	32.5	38	42	5	1.77	13.3	2	62.2	0.49	11.8	1	3	62.3	5
ERA	59.5	29.2	38	57	5	1.91	13.4	9	65.7	0.54	12.6	1	3	62.3	4
FLICKER "S"	56.5	31.6	50	46	4	1.83	12.1	6	60.9	0.54	10.6	3	8	61.6	4
HACOZARI 76	58.5	34.0	43	51	6	1.87	13.2	3	61.9	0.50	12.4	1	4	65.3	4
HAZERA806/76	61.0	34.0	52	43	5	1.67	12.9	2	61.5	0.54	11.7	1	5	64.4	7
HAZERA 855	59.0	33.0	48	48	4	1.94	12.5	4	61.3	0.58	13.3	1	7	58.7	7
HUACAMAYO"S"	57.5	30.5	29	69	6	2.00	14.1	4	61.3	0.56	13.3	1	6	62.3	4
IAS 54	57.0	30.2	13	82	5	2.02	12.6	6	41.7	0.42	12.0	4	8	62.5	2
JAUHARA 77	58.0	29.7	41	53	6	1.91	13.2	3	62.2	0.49	12.5	1	3	65.7	4
JUNCO "S"	60.0	35.8	64	33	3	1.80	12.4	4	55.3	0.45	12.0	4	8	61.9	5
JUPATELO 73	60.0	31.9	45	52	3	1.85	13.0	2	62.2	0.52	12.6	1	4	62.3	6
KAL-88	57.5	29.0	32	60	8	1.91	13.6	1	62.11	0.55	12.7	1	4	64.2	5
KITT	58.5	31.1	60	38	2	1.52	13.2	2	64.5	0.52	12.6	4	2	64.2	5
LIESBECK	61.0	36.4	58	40	2	1.80	13.4	2	65.0	0.48	12.8	1	2	62.5	4
M.J. INTA	59.0	32.8	44	54	2	2.08	14.5	3	64.2	0.56	13.3	1	4	63.2	6
PAVON "S"	60.0	33.0	46	49	5	1.90	14.1	3	62.1	0.56	13.2	1	5	63.5	5
PAVON 76	61.5	35.3	59	38	3	1.81	13.4	2	62.7	0.53	11.9	1	3	62.8	4
PAYON "S"	61.5	35.0	56	40	4	1.89	13.5	3	62.8	0.52	12.0	3	8	63.5	4
PHOEBE "S"	59.0	31.4	37	56	7	1.96	13.2	3	58.9	0.55	12.7	1	3	59.7	4
PINA 77	58.5	29.6	42	53	5	1.70	11.1	8	46.5	0.40	10.7	4	8	59.0	2
PLANINKA	59.0	32.7	63	34	3	1.90	12.6	5	62.5	0.48	11.1	1	3	57.5	5
GUETZAL 75	57.5	32.3	52	44	4	2.05	11.8	8	52.5	0.46	10.8	1	8	59.7	2
SAPSUCKER"S"	59.0	34.7	57	40	3	1.73	11.3	8	51.4	0.41	11.1	1	4	62.8	4
SHASTA	60.0	34.5	39	54	7	1.83	13.4	3	63.8	0.55	12.6	2	8	62.8	3
SHORTIM	56.5	27.1	20	75	5	2.10	13.7	5	60.6	0.58	13.0	1	8	64.4	4
SONALLFA	58.5	42.7	80	18	2	1.83	12.4	4	58.7	0.48	11.5	1	8	61.3	2
SONDEREND	60.0	37.7	62	36	2	1.69	14.4	2	61.3	0.52	13.5	1	5	64.7	5
SONGLEN	56.0	28.9	36	60	4	2.03	14.6	4	62.4	0.53	14.3	2	4	67.6	5
TITMOUSE "S"	58.5	28.8	30	64	6	2.04	13.4	3	55.8	0.56	13.3	2	8	66.3	6
TORIM 73	56.5	26.6	17	78	5	2.14	14.1	5	60.0	0.61	13.4	2	8	63.8	7
TOWHEE "S"	61.5	34.4	51	46	3	1.77	13.3	2	63.3	0.46	12.3	1	2	65.0	4
VEERY "S"	56.0	30.5	50	46	4	2.14	13.8	4	57.7	0.64	13.0	2	8	65.7	5
VIREO "S"	59.5	32.6	41	55	4	1.63	13.0	3	61.4	0.56	13.1	1	6	65.7	6
VULTURE "S"	56.5	32.6	36	57	7	2.01	13.0	4	47.7	0.48	12.5	4	8	63.5	6
YECORATO 77	58.5	36.4	46	52	2	1.82	13.4	2	62.6	0.51	13.0	1	3	61.0	8
ZARAGOZA 75	53.5	25.3	20	74	6	2.06	12.7	8	45.6	0.54	12.4	4	8	62.5	3
CGT-700	59.0	31.0	33	62	5	2.02	15.1	4	63.9	0.66	14.1	4	8	67.3	6
CGT-705	60.5	30.0	17	78	5	2.02	14.2	3	65.5	0.54	13.4	1	3	64.2	4

REFERENCE MIXOGRAMS

HARD RED SPRING WHEAT
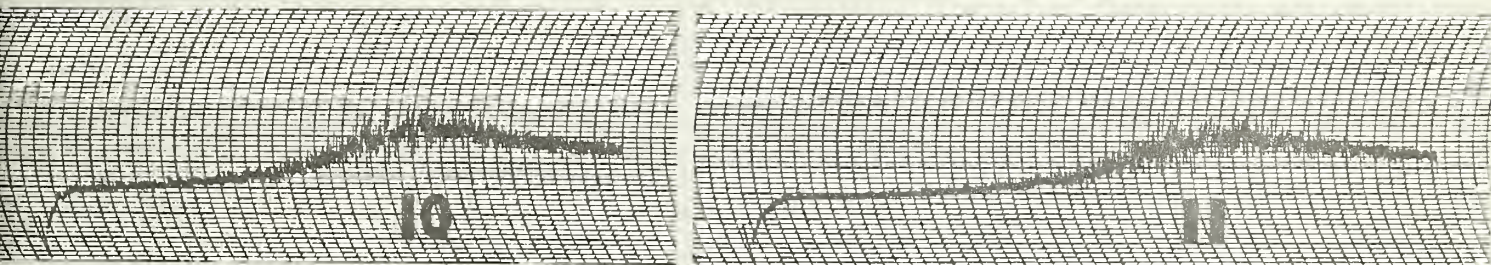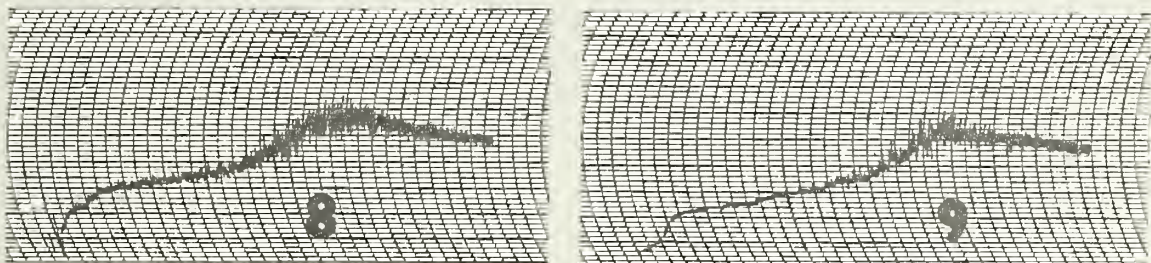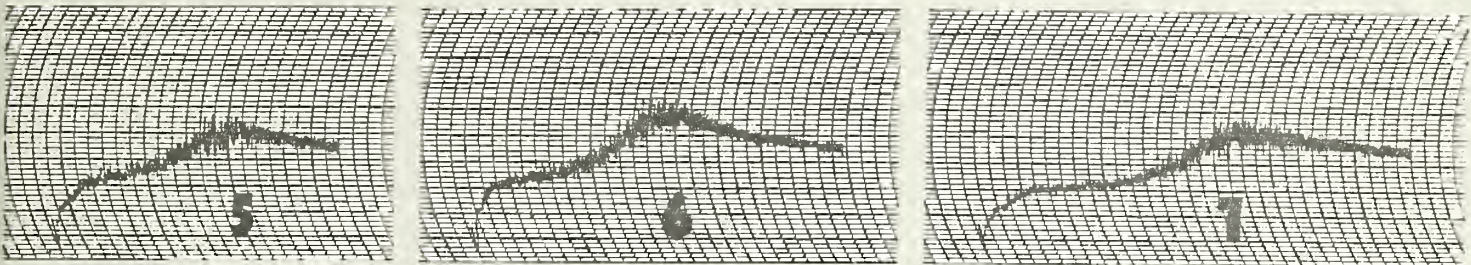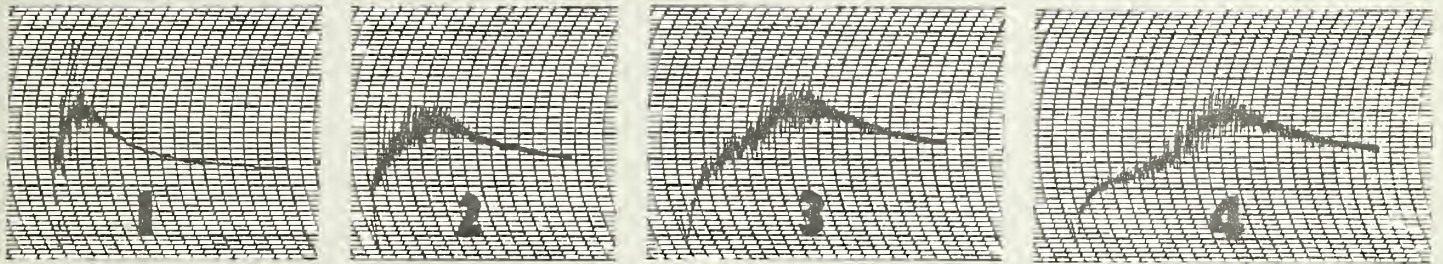
U.S.D.A. SPRING WHEAT QUALITY LABORATORY

FARGO, NORTH DAKOTA